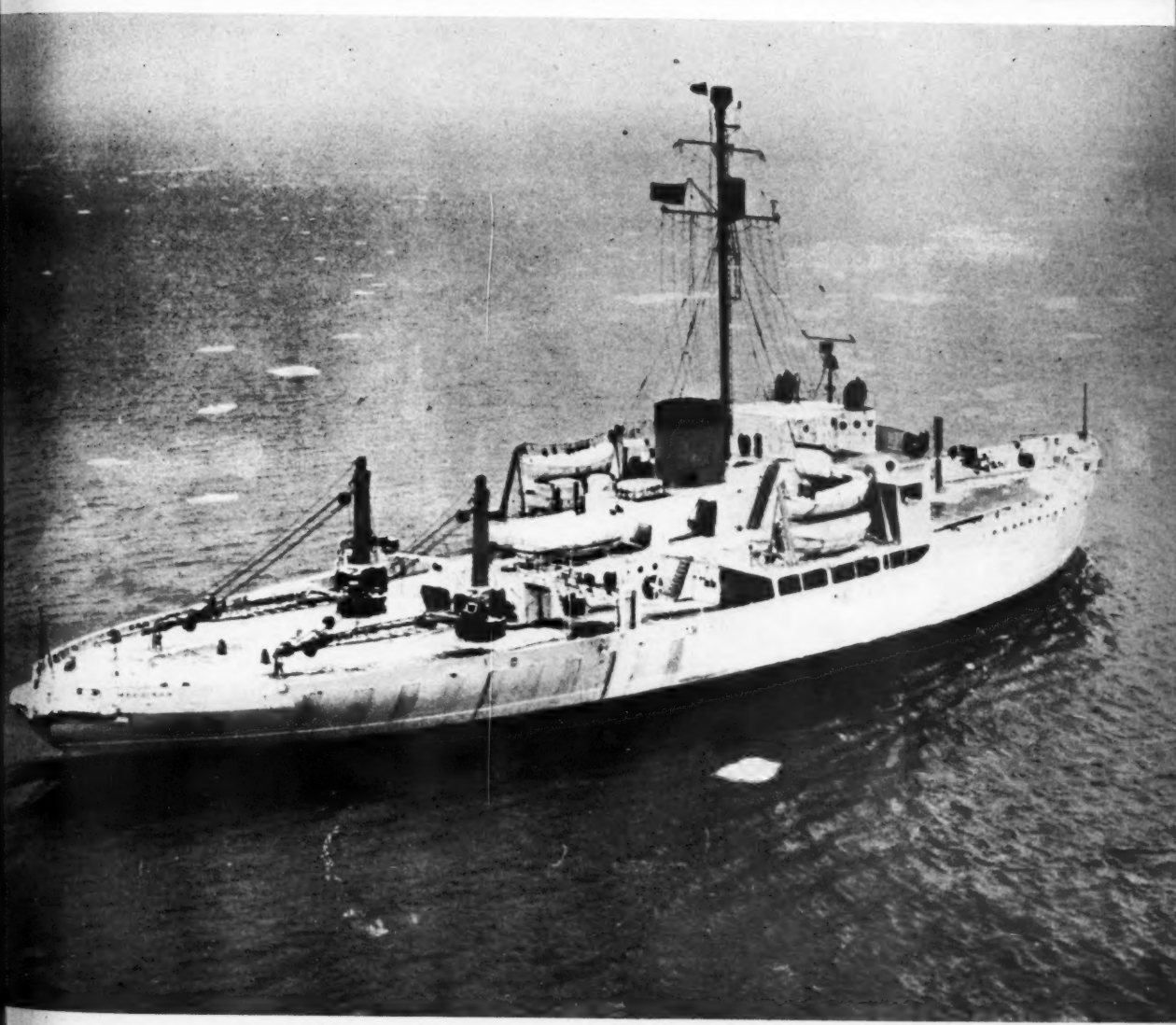


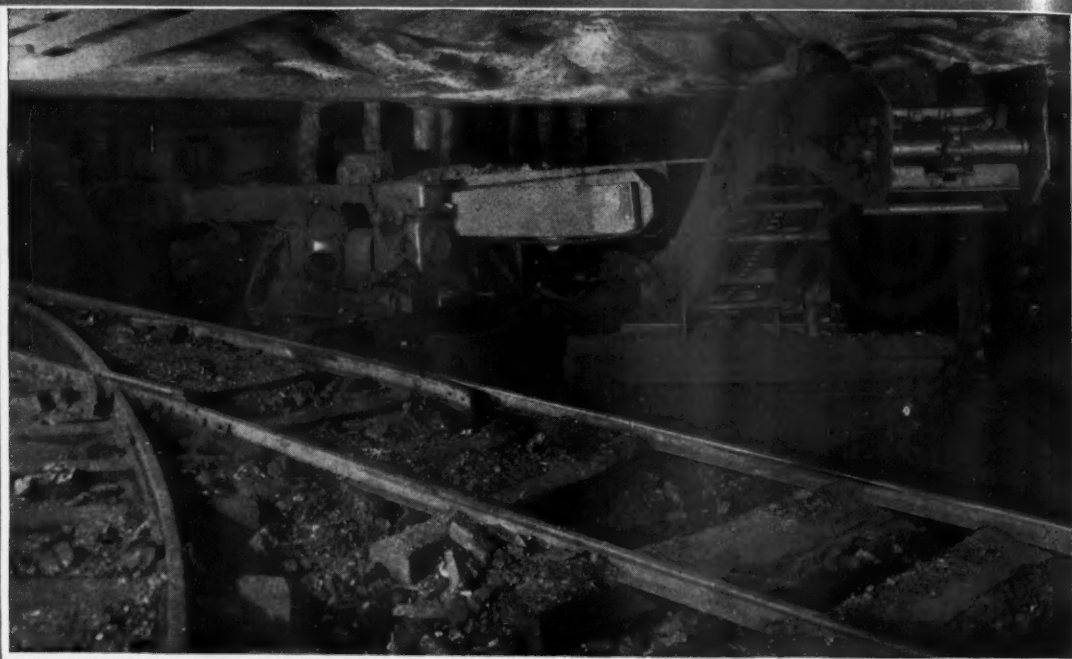
Mining

CONGRESS JOURNAL



JULY
1945





... you'll never discard an **SK** motor!

MORE WESTINGHOUSE SK MOTORS ARE USED IN COAL MINES THAN ALL OTHER MAKES COMBINED

AMPLE DESIGN—guts to carry the heavy loads—rigid one-piece frame with feet welded to frame to provide rigid integral foundation—uniform magnetic path aids commutation.

SPECIALLY DESIGNED INSULATION—field coils wound on rigid Micarta spool—vacuum-impregnated with hydrolene gum—eliminates air pockets. Mica-insulated armature coils—form-wound on all except the smaller ratings—protect against moisture or dust—prevent electrical breakdown.

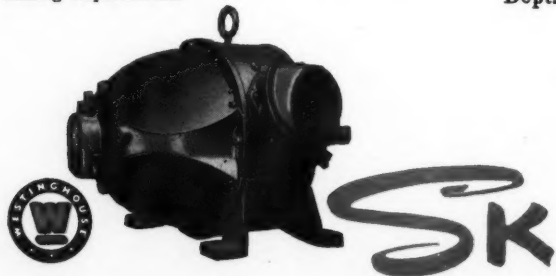
EXCLUSIVE WESTINGHOUSE VESTIBULE SEAL—keeps lubricant in—dust and dirt out.

GREATER ACCESSIBILITY—brushes, brushholders and commutator readily accessible—permits easy brush adjustment or renewal—brushes readily "sanded-in".

WIDE RANGE OF RATINGS—from 1 to 200 hp to meet every mining requirement.

You'll never need to—for SK Motors never go out of date. During the thirty-odd years that SK Motors have been built, the basic construction has never been changed. Certainly, the appearance has changed, and new sizes have been added, but today's vastly improved parts will fit any SK Motor of the same rating and frame size ever built. No wonder these motors have outsold all other makes combined for mining service—they've been the standard in the coal industry since 1911. Here's performance which is unsurpassed for dependability and economical service. See your nearest Westinghouse representative or write for Descriptive Bulletin 3500-1. Westinghouse Electric Corporation, Dept. 7-N, East Pittsburgh, Pa.

J-94603



Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MINING MOTORS

Mining

CONGRESS JOURNAL

VOLUME 31, NUMBER 7

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FOR JULY 1945

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress.

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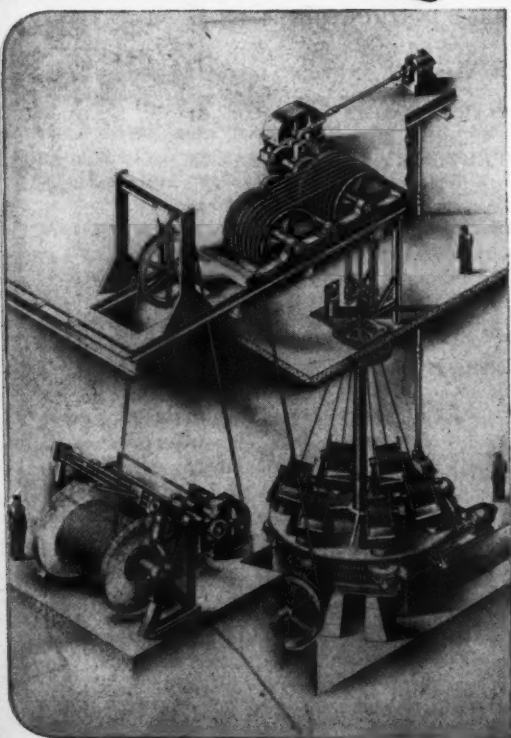
JULIAN D. CONOVER
Secretary

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WHICH

WILL BUILD ROADS •



New War-Borne Techniques Will Make America's Competitive System of Private Enterprise More Efficient Than Ever Before!

Although geared largely to war production, the Union Wire Rope organization is prepared to shift overnight to fill home-front requirements in wartime tempo. For instance, at the left is shown a giant wire rope closing machine developed by Union Wire Rope engineers in the war emergency. It is three stories high, has a range of $\frac{3}{4}$ inch to 4 inch wire rope and a maximum capacity of 27 tons of wire rope in one continuous length. Union engineers have devised many other new facilities and techniques with which to serve private enterprise more efficiently than ever before. Our war work has been such that our craftsmen will not have to relearn their skills.



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STREETS • AIRPORTS • FLOOD CONTROLS

...keys to new frontiers?



Let's pull together

FOR THIS KIND OF AN AMERICA

Americans have called upon their national leaders for a far-reaching highway system, a network of airports, and a long-studied program of flood control and land conservation. Why? Because they are the keys that will open new frontiers and because they are among the few proper and fertile fields for the investment of public funds.

Our leaders in Congress have responded by approving our largest highway and flood control programs and doubtless will respond with an airport program.

But, the approved programs are not being pushed to finalization in many states. The National Highway Program, for example, is based upon state responsibility for plans by State Highway officials and funds by State Legislatures. No citizen can afford to let this sound program go by default. If there is a lag in your theatre of operations, make it your concern. Send the coupon for "The Road Ahead", published by the American Road Builders' Association, and "Put Your Town on the Air Map", published by the Personal Aircraft Council of the Aeronautical Chamber of Commerce of America.



UNION WIRE ROPE CORPORATION, 214th Manchester Ave., Kansas City 3, Mo.

- ☐ Send a Free copy of book entitled "The Road Ahead"
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Firm.....

Address..... City..... Zone..... State.....

D-48

WANT A GREATER PERCENTAGE OF LUMP COAL?



**There's a Hercules Permissible
that fits your needs!**

You'll find in this simplified list below, the Hercules Permissible that most closely meets *your* particular needs . . . streamlining your operation to maximum efficiency and greater tonnage. Over years of research, Hercules has long been a leader in developing modern, improved explosives. Whatever your problem, Hercules has the answer in its wide range of permissibles.

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934 KING STREET
WILMINGTON 99, DELAWARE



*Reg. U. S. Pat. Off. by Hercules Powder Company

HERCULES PERMISSIBLES	
TYPE OF WORK	Approximate No. of 1 1/4" x 8" Car- tridges per 100 lbs.
<i>For Lump Coal</i>	
Red H* C	276
Red H* D	316
Red H* F	356
<i>For Rock or Fine Coal</i>	
Red H* B	280
Collier* C	320
<i>For Wet Work</i>	
Hercogel* A	200
Hercogel* 2	240

XP-54

★ Need Replacements In End-Dump Or Rotary-Dump Cars?

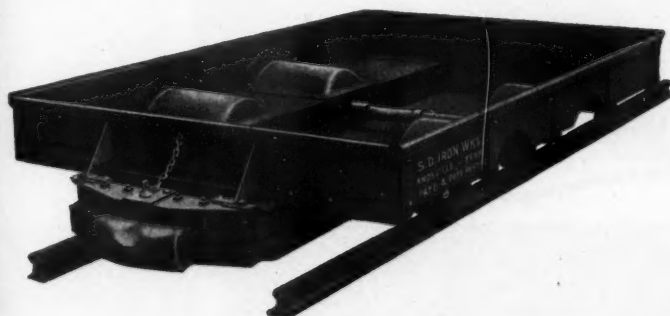
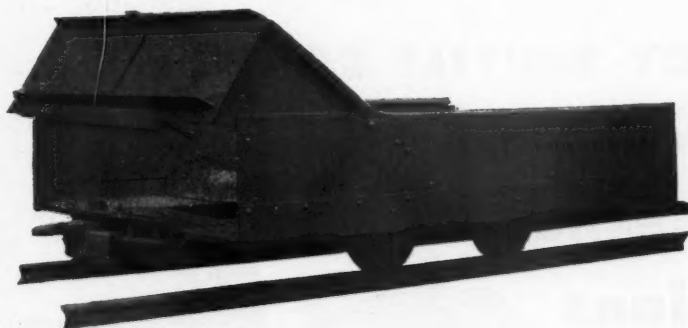
Throughout the coal mining industry, for almost 40 years, Sanford-Day has been recognized for their ability to build End-Dump and Rotary-Dump cars that stand up through the years to meet the

hard service demanded of these cars. We developed the "low-floor" types of large capacity cars and our "Whopper" End-Dump and Rotary-Dump Cars will give you maximum capacity for any given overall dimensions.

S-D "WHOPPER"

END-DUMP CAR

With our cantilever construction, heavy structural steel side truss members easily support the heaviest load without sagging. They are attached to the rugged cross cantilever members at the body corners and run from one end of the body to the other. This car has Drop Axles and Armor plate bumpers. No other design of End-Dump car approaches its simplicity, strength, ruggedness and long life. No binders on side to strip off.



S-D "WHOPPER"

ROTARY-DUMP CAR

Cantilever construction. Maximum capacity. No binders to strip off against ribs. No unnecessary weight. Easily repaired. Supporting all the weight on the flares are the massive crosswise cantilever structural members at the ends of the car body, resting on and attached to the rectangular steel truck frame. Simple, strong. Pan Bottom. Drop Axles. Armor Plate Bumpers.

For Increased Production and Drastic Savings
Change Over to S-D 1-2-3 "Automatics"

★ You can easily discharge 15 to 20 S-D "Automatic" cars of coal a minute . . . a big saving in time compared with End-Dump or Rotary-Dump cars of equal capacity. In addition, the S-D 1-2-3 "Automatic" doesn't dump the coal, it lays it down gently through one door opening at a time . . . reducing breakage of coal to the minimum.

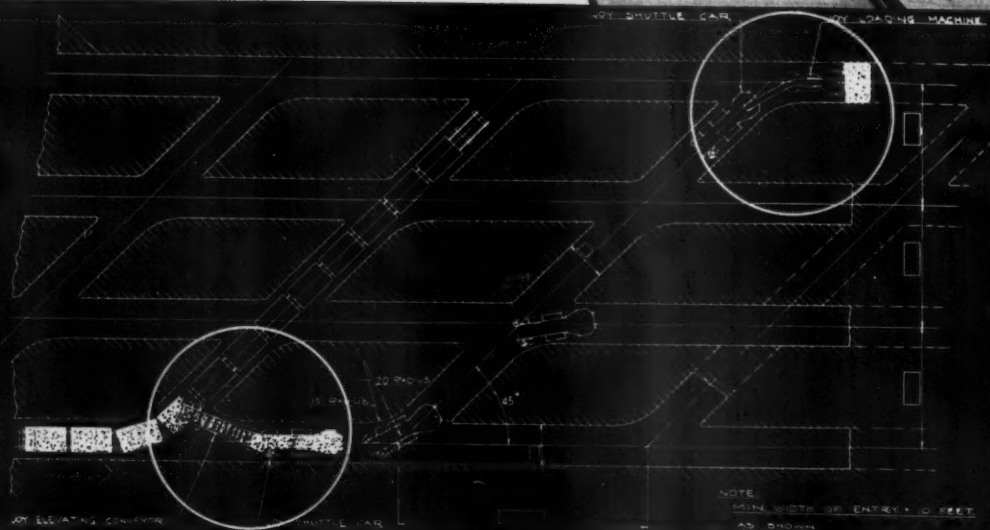
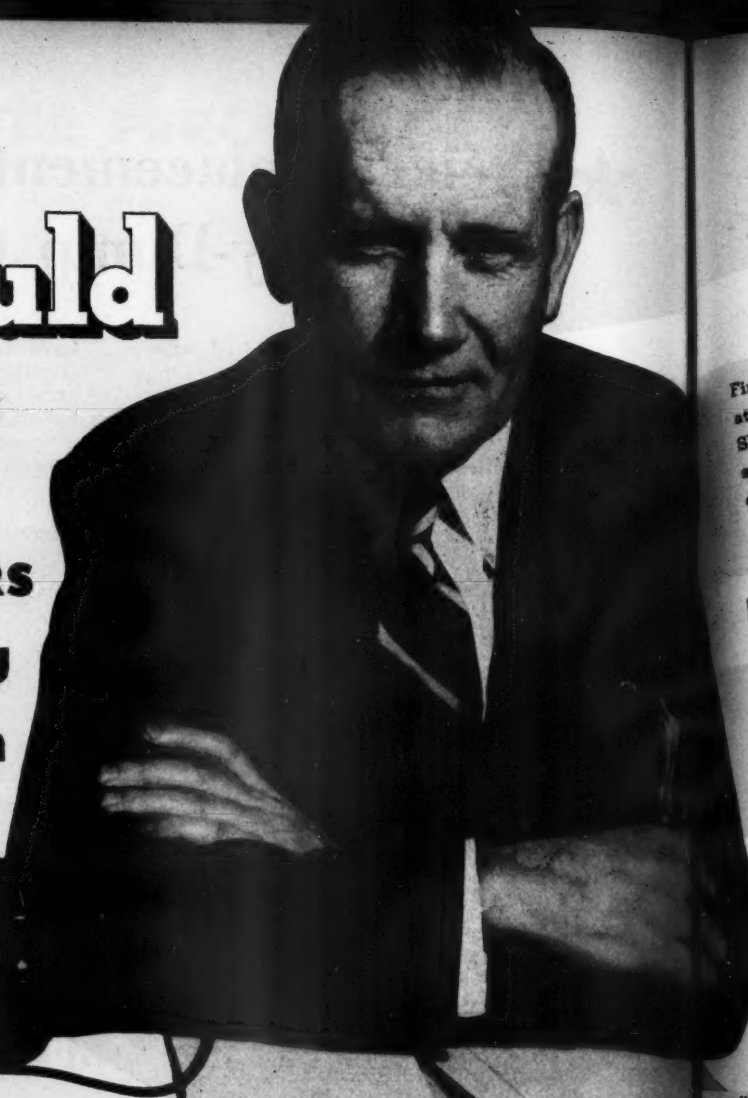
The S-D "Automatic" leads an easy life compared with End-Dump and Rotary-Dump cars, and, consequently, it lives much longer. The resultant savings in maintenance is a big item. Changing over to S-D 1-2-3 "Automatics" will pay you well. Investigate them now.



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

You Should

consider these
advantages of
JOY SHUTTLE CARS
before making
mechanization
plans



JOY MANUFACTURING

Saves many man-hours

Finger-tip controls enable a single operator to drive, load, and unload the Joy Shuttle Car. A conveyor type of bottom speeds up loading . . . permits it to be done directly from a Joy Loading Machine, at the same time evenly distribut-

ing the load throughout the car. No extra handling along the line . . . no "jockeying" of cars for position or extra men needed to shift equipment to accommodate the loader. It is extremely flexible . . . adaptable to many needs.

Eliminates moving of stationary equipment

There are no rails to lay, pick-up, and re-lay when a mine is shuttle-car equipped. That's another fact worth considering, particularly if speed is important to reducing production costs. Joy Shuttle

Car Mining has the further advantage of requiring no "time out" to lengthen belts or add another section onto conveyors. Cars may be kept in motion a greater percentage of working time.

Has low maintenance cost

Because they're sturdily built, Joy Shuttle Cars can take plenty of punishment without breaking down. For regular over-hauls and periodic check-ups, all machinery is easily accessible, permitting

the work to be done in a minimum of time. Low maintenance costs mean lower overhead . . . more margin of profits on production for you. Investigate Joy Shuttle Car Mining today!

Joy 42" Shuttle Car discharging its load into a Joy Elevating Conveyor.

Joy 11 Bu. Loader loading into a Shuttle Car in 7' seam.



COMPANY FRANKLIN, PA.



*Consult
your Joy
Engineer*

SHORT-TRAVEL TUBULAR VALVE • WET OR DRY OPERATION • ENCLOSURE
 CUSHIONED RETAINER • SPEED PLUS POWER • 4 WEIGHT CLASSES
 SIMPLE CONSTRUCTION • LOW MAINTENANCE • ECONOMICAL OPERATION
 AUTOMATIC LUBRICATION • POSITIVE THROTTLE CONTROL • STRONG
 BLOWING POWER • POWERFUL ROTATION



"I'm Hitting"

A Complete Thor Line
 16 MODELS IN 6 SIZES

Model 38-42
 Sinker Rock Drill



Model 39-441b
 Auger Rock Drill



PORTABLE
Electric & Pneumatic
TOOLS

OSE
ASSE
ATION
RON

g

Line

S

LS

the Rock

for More Holes Per Day"

OPERATES ALL DAY ON LESS AIR



Thor
Short-Travel
Tubular
Valve



One reason for the air economy of Thor Sinker rock drills lies in the patented Thor valve and valve chest design. This enables Thor tools to utilize effectively all the air that enters the machine. Spaces between valve flanges and valve chest shoulders through which air enters are controlled to a tolerance of .00025 of an inch.

On left above: shoulder measures the exact amount of air needed to drive hammer on the power stroke. On right: measuring precisely the air for return stroke. Trapped air makes performance smooth and uniform.

Ask the man who runs one, and he will tell you there is something about Thor Sinker Rock Drills that allow long drilling periods without too much wear and tear on the operator. It's the work that gets done, not the operator. A combination of features makes this possible—ample power and speed, smooth control with a four-position throttle, and accurate balance in the design of the tool.

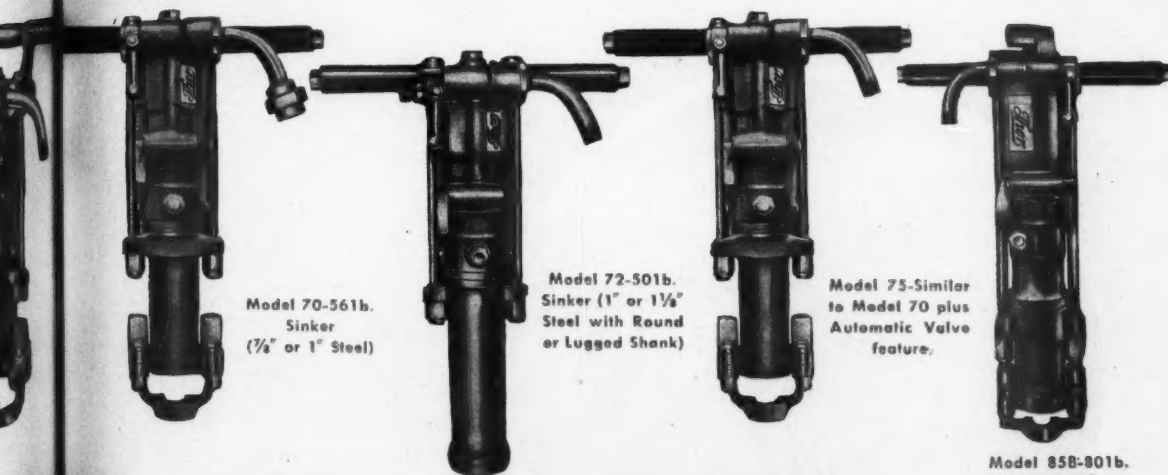
From the standpoint of the company which puts its money into such tools, the Thor line is a safe long term bet—They're well made of the finest heat-treated steel and have a world-wide reputation for long dependable service. Besides, both operating cost and maintenance are very low. Certainly Thor is a line to standardize on and settle sinker problems for years to come.

Specifications? Catalog 42A tells about the whole line of Rock Drills, Paving Breakers, Sump Pumps, Clay Diggers, etc. Ask for it.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 West Jackson Boulevard, Chicago 6, Illinois

New York • Los Angeles



Model 70-561b.
Sinker
(7/8" or 1" Steel)

Model 72-501b.
Sinker (1" or 1 1/8"
Steel with Round
or Lugged Shank)

Model 75-Similar
to Model 70 plus
Automatic Valve
feature.

Model 85B-801b.
Sinker (1 1/8" or
1 1/4" Steel)

SINKER ROCK DRILLS



Enclosed tamper proof retainer springs are permanently set at correct tension to make steel removal easy and fast,—shielded against clogging by dirt or rock particles.

COORDINATED ENGINEERING *Gets Results!*



This is one of many efficient coal preparation plants developed through Coordinated Engineering. Mine Engineers and Equipment Engineers worked together with U. S. Rubber Belt Engineers in designing the conveyors. Coal volume is high and steady, production costs are low.

Insures low-cost tonnage in conveying coal, rock, ore

In planning your mechanical equipment, you may not need the biggest plant or the longest belt. All you want is a complete system of material handling that will be most efficient for your operation.

Whether your plant is large or small, we believe that the best way to achieve high volume at low cost per ton is through coordinated engineering. This

means combined planning by engineers representing mine operators, designers of conveyor equipment, and U. S. Rubber Company.

Thousands of conveyor installations have already been built through this three-way teamwork. Some are small... some immense. But all of them are consistently efficient and economical in operation.

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue, Rockefeller Center, New York 20, N. Y. • In Canada: Dominion Rubber Co., Ltd.

SERVING THROUGH SCIENCE





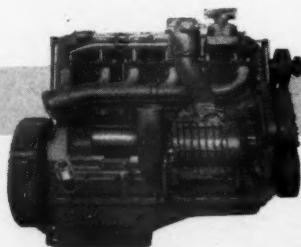
Of this... **SURE**

SURPLUS POWER IS PROTECTION . . . protection against the damaging shocks, jerks and strains that add to the abuse and shorten the life of powered mining equipment when there is barely "enough power" for *normal* requirements. *Surplus power* is protection, too, against lagging work cycles or accidents because reserve power is always available to handle peak loads or to meet any emergency.

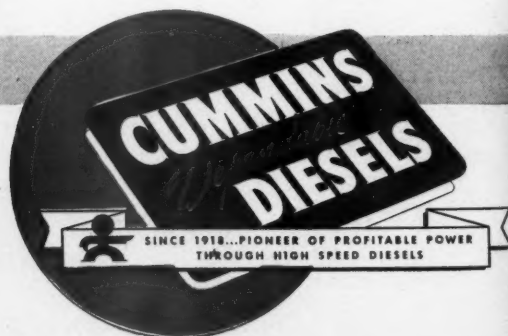
For your stripping, loading, hauling or cutting equipment, you can be sure of *surplus power* at the minimum cost in space and weight by standardizing

on Cummins Dependable Diesels. Three compact, low-weight-per-horsepower models—150, 200 and 275 hp.—have almost the same mounting dimensions and may be used interchangeably in many cases. All have the same basic design and incorporate a large percentage of the same parts. This assures a simplified service procedure and reduces the parts inventory . . . important points in holding down costs and increasing profits.

Have you carefully considered these advantages in specifying Cummins Diesels for your equipment?



Illustrated is the supercharged, 275 hp. Model NHS Cummins Diesel. In design, dimensions and weight it closely approaches the 150 hp. Model H and the 200 hp. Model NH. All are designed for mining service. Ask for specifications.

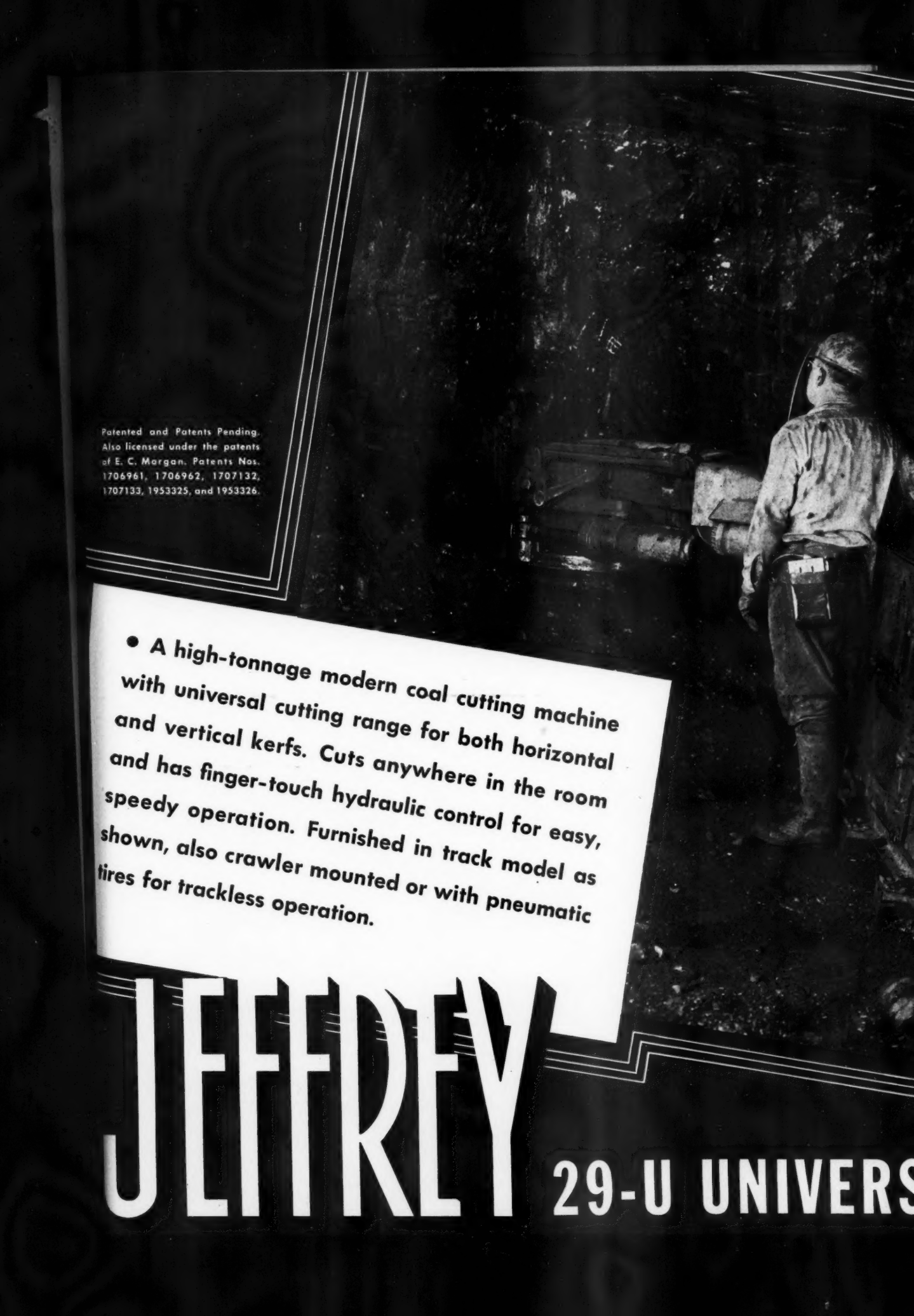


CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

PUBLIC UTILITIES
Consume Approximately
**163 MILLION TONS
OF COAL ANNUALLY**



JEFFREY has a stake
in this production by means of the
vast amount of equipment used to
produce this coal at costs which
make it an economical fuel... drills,
cutters, loaders, mine conveyors,
fans, locomotives, and allied units.



Patented and Patents Pending.
Also licensed under the patents
of E. C. Morgan. Patents Nos.
1706961, 1706962, 1707132,
1707133, 1953325, and 1953326.

- A high-tonnage modern coal cutting machine with universal cutting range for both horizontal and vertical kerfs. Cuts anywhere in the room and has finger-touch hydraulic control for easy, speedy operation. Furnished in track model as shown, also crawler mounted or with pneumatic tires for trackless operation.

JEFFREY

29-U UNIVERS



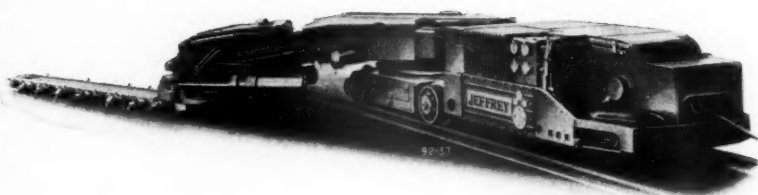
ERSAL COAL CUTTER

Jeffrey CUTTERS

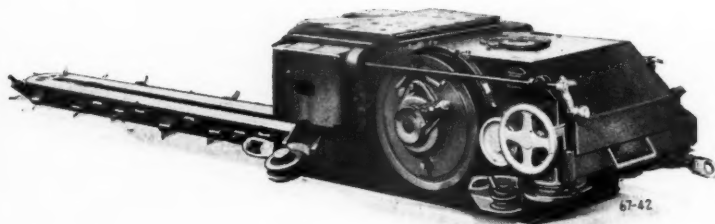
**JEFFREY SERVICE
TO THE COAL MINES
MEANS SERVICE
TO ALL INDUSTRY**

**JEFFREY EQUIPMENT
FOR COAL MINES**

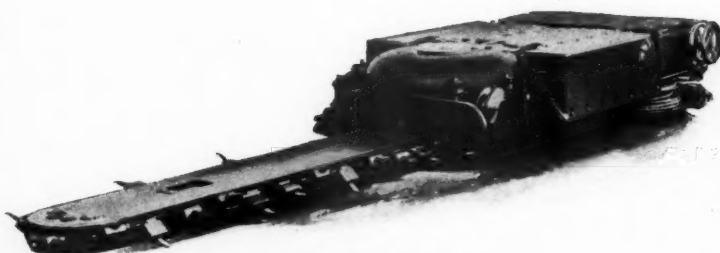
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



Jeffrey 29-U Universal Coal Cutter
(Track type — crawler mounted — pneumatic tires)



Type 35-BB for Continuous Cutting



Type 35-L for Low Veins

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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Johannesburg, S. A.

How many dollars is a good truck worth?...

When Lincoln was asked how long a man's legs should be, he answered, "Long enough to reach the ground."

The same homespun reasoning applies to the worth of a motor truck. The work you get out of it is what counts.

That is why Mack trucks are bargains—*on the job!* Mack trucks are *built* to work harder, to last longer and to operate at lower ton-mile cost.

For instance, when you use heat-treated alloy steel to the extent Mack does in every truck, you aren't aiming at price.

What you do aim at—and get!—is more work for longer time with less repairs and lower overall cost.

Mack's better construction has been making money for Mack owners since 1900. Now is the time to find out what it can do for you.



★ BUY THAT EXTRA WAR BOND TODAY ★



Mack Trucks, Inc., Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS

FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

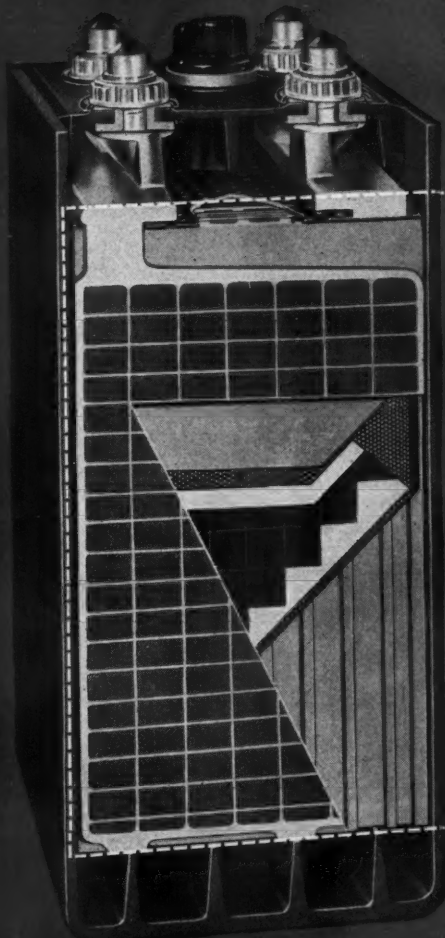


NEW Mack Trucks
are available for
essential civilian use.
Ask for details.

KATHANODE

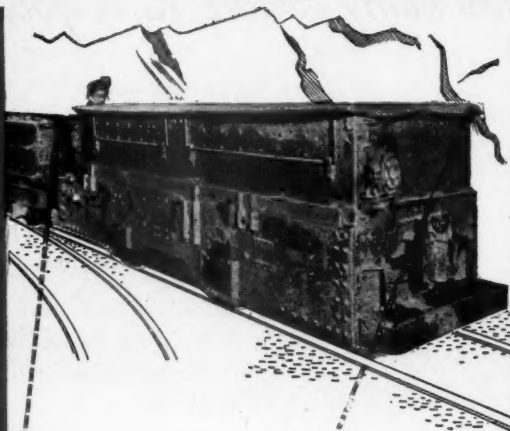
HAS MORE WORKING

Electrolyte



GOULD

PIONEER OF GLASSKLAD CONSTRUCTION



TO DRIVE YOUR MINE LOCOMOTIVE FASTER AND FARTHER!

You can run your mine locomotive farther and faster on a single charge if the batteries are Kathanode.

Look at the diagram at the left. It shows the area between the top of the bridge and the normal electrolyte level in a typical Kathanode battery. This is the space devoted to useful electrolyte.

There is more of this working electrolyte in a Kathanode than in any battery of the same over-all dimensions. To you it means that mine locomotive speed is sustained, trips are faster and greater in number. It is economical mine locomotive operation.

Write Dept. 127 for Catalog 200 on Gould Kathanode Glassklad Batteries for Mine Locomotive Service.

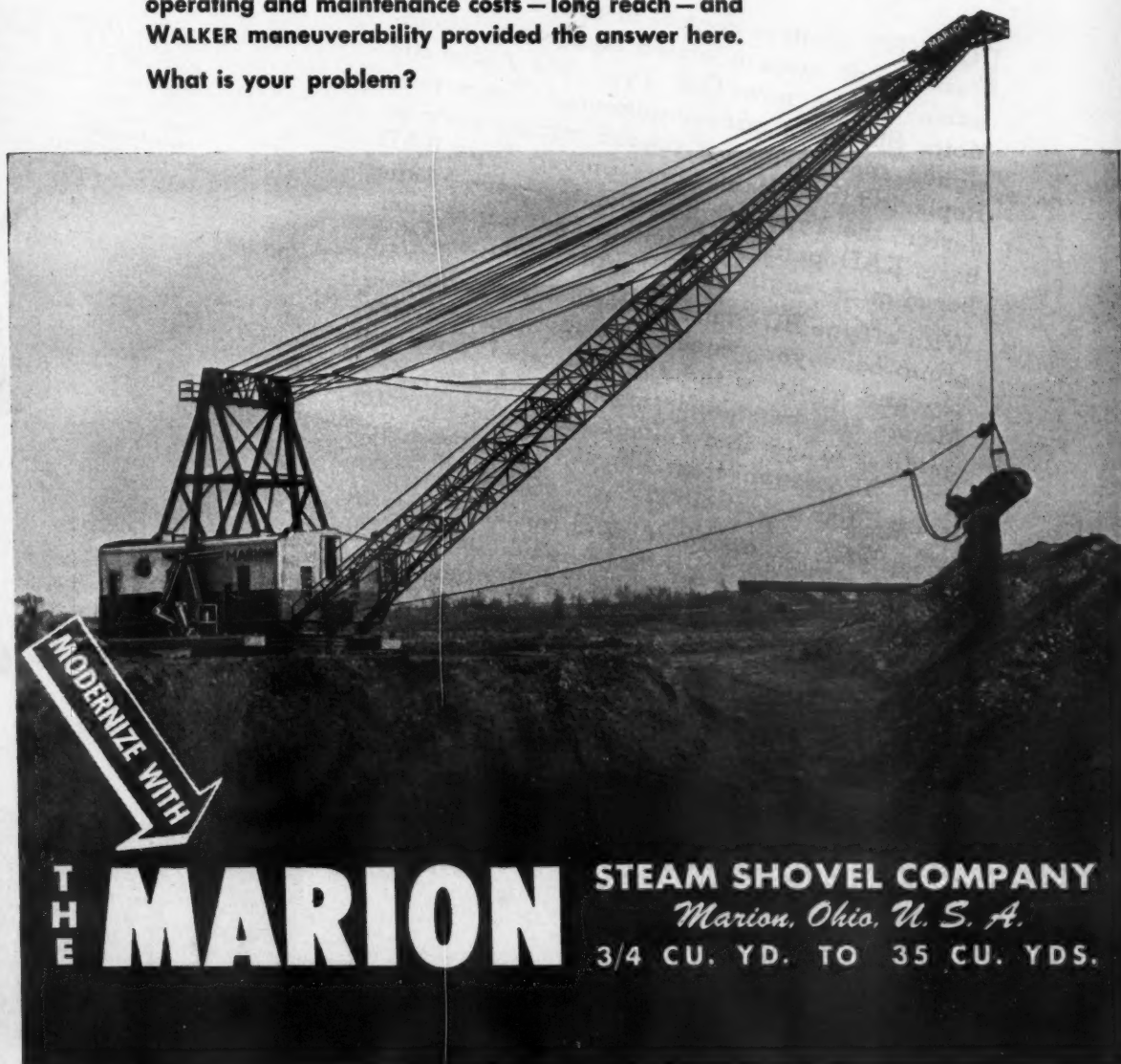


GOULD STORAGE BATTERY CORPORATION, New York, N. Y. *Branches:* Atlanta • Chicago • Dallas • Denver • Leavenworth
Los Angeles • North Bergen • Rock Island • Saint Paul • Sioux City • Zanesville

A RATIO OF 33 TO 1 OVERBURDEN SOLVED WITH **MARION WALKERS**

To mine profitably a 20" seam of coal under 55 feet of rock and shale overburden, The Clemens Coal Company of Pittsburg, Kansas, uses MARION WALKERS. Low operating and maintenance costs — long reach — and WALKER maneuverability provided the answer here.

What is your problem?



MODERNIZE WITH

THE MARION

STEAM SHOVEL COMPANY
Marion, Ohio, U. S. A.
3/4 CU. YD. TO 35 CU. YDS.

for the **INSIDE STORY**

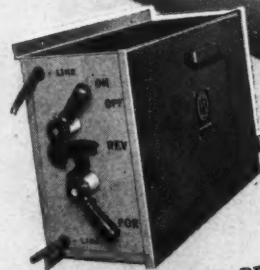
**INVESTIGATE THESE MINE-ENGINEERED *FEATURES OF
THE NEW O-B TYPE BD AUTOMATIC MOTOR STARTER**

FOR THE positive control of conveyor drives and other motor-operated equipment, standardize on the new O-B Type BD Automatic Motor Starter--a mine-engineered starter designed specifically for rugged mining service. Replacing the reliable, time-proved Type KAD design, the Type BD incorporates many of the basic KAD parts; includes, in addition, a number of mine-engineered improvements.

With a Type BD Starter, interlocking control of group conveyor systems may be achieved simply and easily without complicated rewiring. Motors may be started smoothly and evenly regardless of low line voltage or excessive motor load. Protection from abusive overloads and short circuits is afforded.

Keep your motors running at top efficiency by letting Type BD Motor Starters handle the vital control function. And when buying new equipment, make certain it is equipped with O-B Type BD Starters. Specify them on your next order.

MAJOR PARTS INTER-CHANGEABLE WITH KAD STARTER--uses same contactors and parts, same thermal overload unit and same starting resistance as time-proved O-B Type KAD design.



SELF-CONTAINED REVERSING SWITCH--if desired, Type BD Starter may be equipped with reversing switch, interlocked with control switch to prevent reversal with power "on."

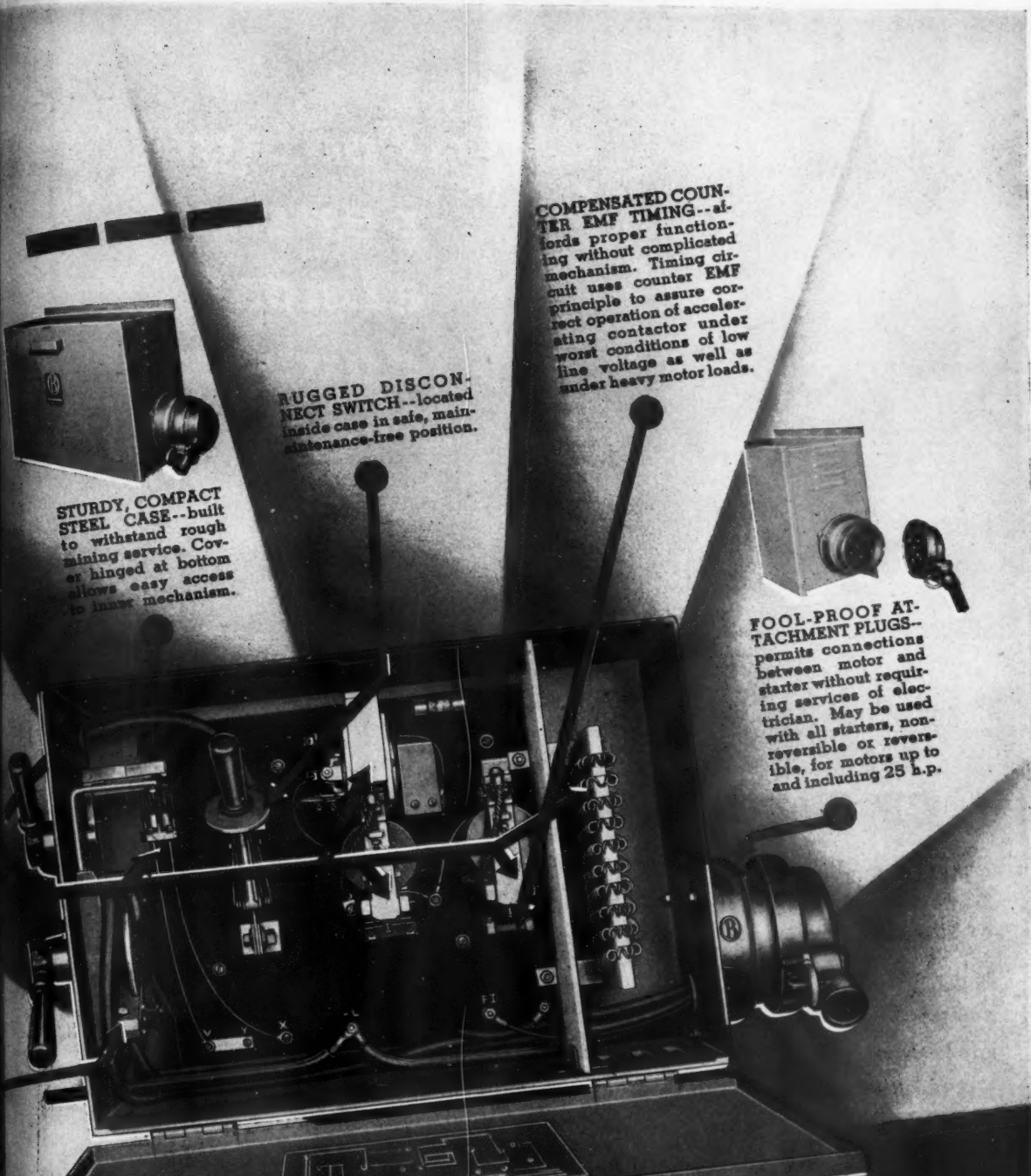
Clip and Mail for Complete Data

OHIO BRASS COMPANY, Mansfield, Ohio

I'd like to have more information concerning your new Type BD Automatic Motor Starter. Please send me a copy of Booklet 792M giving complete data.

Name _____
Title _____
Company _____
Address _____

FOR MOTORS FROM 5 TO 75 H. P., 250 AND 550 VOLTS D. C.--Furnished with single-step starting for motors from 5 to 25 h.p. incl., with two-step starting for motors from 25 to 75 h.p. incl.



RUGGED DISCONNECT SWITCH--located inside case in safe, maintenance-free position.

STURDY, COMPACT STEEL CASE--built to withstand rough mining service. Cover hinged at bottom allows easy access to inner mechanism.

COMPENSATED COUNTER EMF TIMING--affords proper functioning without complicated mechanism. Timing circuit uses counter EMF principle to assure correct operation of accelerating contactor under worst conditions of low line voltage as well as under heavy motor loads.

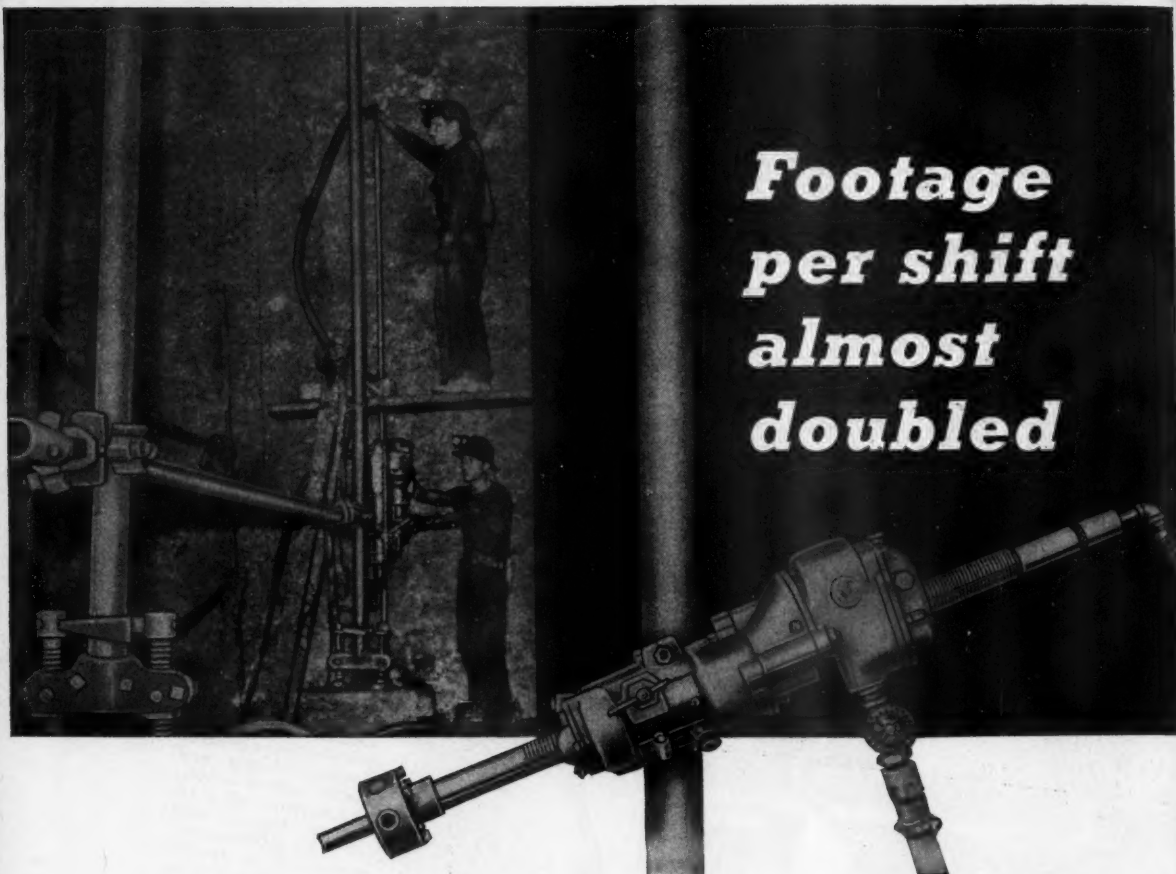
FOOL-PROOF ATTACHMENT PLUGS--permits connections between motor and starter without requiring services of electrician. May be used with all starters, non-reversible or reversible, for motors up to and including 25 h.p.

 **DESIGNED BY MINING MEN TO MEET
MINE OPERATING CONDITIONS**

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.



**Footage
per shift
almost
doubled**

with CP No. 5 Blast Hole Diamond Drill

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A

Above—
Shows sprocket
of SIDE
KARR
and deta
bucket d

Right —
of the s
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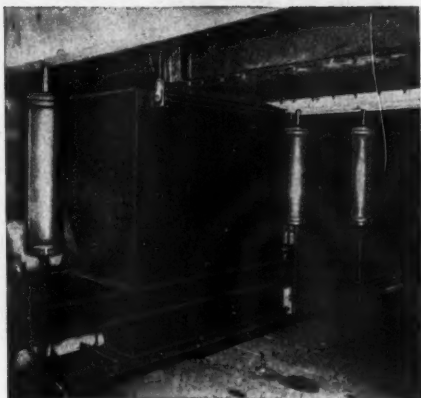
Above—
KAR-KAR
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and sprin

Announcing A NEW "RUN-AROUND" CONVEYOR

The LINK-BELT >SIDEKAR-KARRIER< An Innovation in Modern Coal Handling



Above — Shows idler-sprocket end of SIDEKAR-KARRIER and details of bucket design.

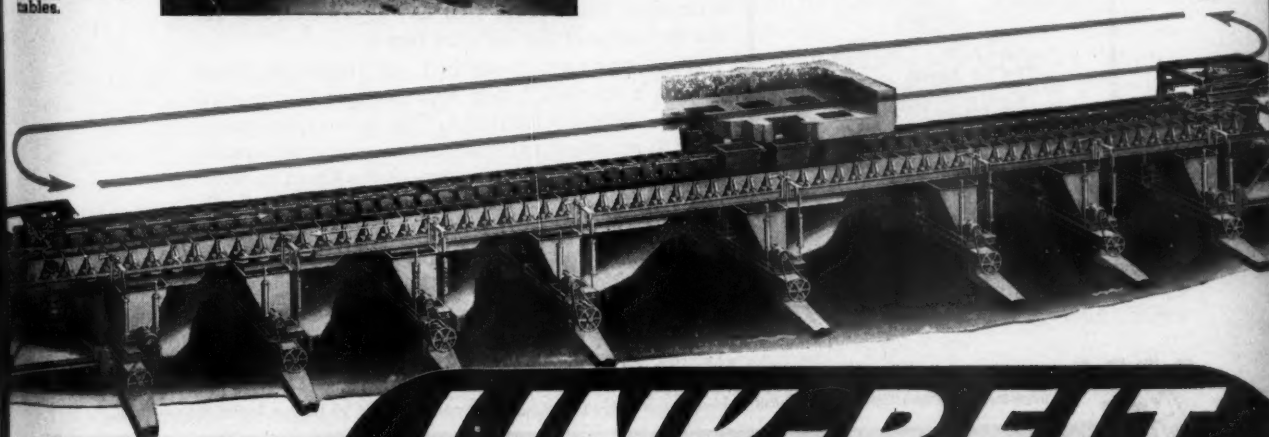


Right — Two of the spring-suspended hoppers underneath the carrier from which coal is fed to the washing tables.

A basically new type of conveyor of the "run-around" type, the SIDEKAR-KARRIER travels in a horizontal plane, is self-feeding and self-discharging and requires little headroom. Conveyor storage is provided for coal and other bulk materials to be discharged simultaneously in varying quantities to a number of points. Continuous, automatic operation is provided, since the conveyor is self-feeding and self-discharging. The material is carried in buckets supported on rollers, rather than being dragged by flights in a trough; which minimizes wear due to abrasion, reduces chain pull, saves power and effects quiet operation. Segregation as to size is eliminated. A typical installation of the SIDEKAR-KARRIER for coal preparation plants (lower illustration) is that of the Alabama By-Products Corp., where this type of conveyor prevents segregation of coal and provides uniform feed to washing tables. Hopper filling is automatic; hoppers are spring-suspended and when a hopper requires coal, it rises and engages trippers on the undercut gates of the buckets. Folder No. 2068 shows the Link-Belt SIDEKAR-KARRIER in detail. We'll be glad to send you a copy.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va.,
Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4,
St. Louis 1, Seattle 4, Toronto 8.



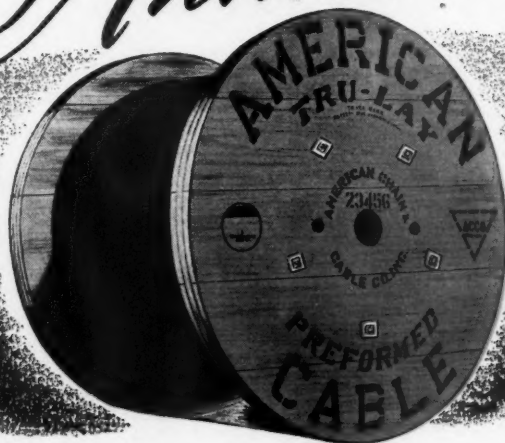
Above — Diagrammatic view of SIDEKAR-KARRIER in coal preparation plant showing multiple bin openings and spring-suspended hoppers.

LINK-BELT

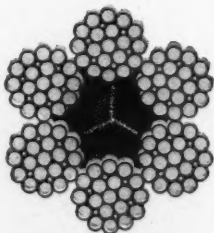
> SIDEKAR-KARRIER < Bulk Conveyor

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Published for the Entire Mining Industry
by The American Mining Congress
S. A. TRENGOVE, Editor

Volume 31

JULY, 1945

Number 7

More Government Competition

THE proposed Bankhead-Hill-Flannagan national fertilizer bill provides fully for entrance of the government into the plant food business—a field already excellently managed by private enterprise. It authorizes government construction, ownership and operation of fertilizer plants and condemnation of mineral lands. The bill is seen as a further attempt by the government to achieve full control of potash and phosphate mining operations.

The sponsors, however, erroneously contend many things in the bill's build-up. They say that the industry is falling down on the job and that our farms aren't getting all the plant food they need. Government records of steady improvement in crop yields over many years tell a different story. They present a low national figure on pounds of fertilizer per acre as compared to foreign lands, but neglect to say that large acreages here still require little or no such assistance. Naturally, this brings the average down. Many similarly biased contentions can be cited.

Free fertilizer for some 225,000 farms is planned as well as putting the plant food business into the hands of government-sponsored cooperatives. Obviously this authority, once in action, can but result in further deficit financing and bureaucratic controls. The "helping hand" while regimenting the farmer will also destroy a healthy and free existing enterprise.

The program offered by the newly created American Plant Food Council possesses far greater opportunity for real progress. Embracing all phases of the fertilizer industry, it is organized to improve relations between the industry, government and the public. It will aid members and farmers by keeping them up to date on plant food needs as developed by all research agencies. It will cooperate with such agencies to the fullest extent in conducting experiments, studies and surveys for the best possible fertilizer utilization.

Its program constitutes a wholehearted American procedure in contrast to that proposed in the bill. The government acquisition activities authorized would ruin the future of a now vigorous mineral industry only to set up additional expensive agencies and operatives to further distress the taxpayer.

Unified Effort Might Help

AT THIS writing some coal mines are still idle because of their inability to operate at the new wage scale on the basis of OPA's price limits. The painful slowness with which OPA moves seems to indicate a long day ahead before adequate relief is established throughout the industry.

Operators from Districts 2 and 8 and their congressional delegations are on the job in Washington with concerted effort in mind as a help toward operable prices. They are suggesting that other districts join them, feeling that unified effort will have greater effect. The least such moves can do is serve notice on OPA that its ill-advised price formula has fallen far short of needed results, and that hardship in the operation of our coal mines is still by no means at an end.

Foreign Trade Victory!

THE Senate sent the Doughton Foreign Trade Agreements extension bill to the White House on June 20. Regrettably, it went to the President minus any of the amendments offered in the interest of fortifying home industries.

The Senate Finance Committee's recommendation against the further 50 percent reduction clause was rejected and the McFarland proposal to prevent lower rates on products of farms and mines was stricken down, as were all other attempts at amendment. In such an atmosphere, the "Bailey amendment" exempting strategic and critical metals from duty cuts was not offered on the Senate floor. The effect of these omissions on the future status of American industries and the American standard of living may indeed constitute empty victory for the bill's proponents.

Some measure of hope is retained, however, in two notable circumstances:

(1) The War and Navy Departments will have representation in future trade negotiations. It is to be hoped that their voice and views on the maintenance of a going domestic mining industry will carry the weight to which they are entitled.

(2) President Truman, through his Investigating Committee activities, has built up a reputation for full consideration of national problems and has acquired a broad acquaintanceship with our raw materials industries. Incidentally, his home state is important as a raw material source and especially as the nation's top producer of lead. His record indicates that he will not act impulsively upon tariff proposals if he can be shown that they would harm a basic domestic industry.

Withal there is probably a better chance now that trade agreements will be carried out on the basis of carefully determined facts instead of pre-determined objectives—a condition which has been one of the most serious objections to past tariff negotiations.

Diamond Core Drilling Bituminous Coal Lands

Diamond Drilling Provides an Excellent Aid in Gathering Preliminary Information on a Coal Deposit But the Results of Exploration Must be Carefully Examined and Interpreted



By **LEE M. MORRIS**

Professor of Mining and Head
Department of Mining and Geology
West Virginia Institute of Technology

THE diamond core drilling of bituminous coal lands, and other commercial mineral lands, provides cores of rock from which approximately complete stratigraphic sections of the subsurface strata may be made. This affords an excellent opportunity to study in vertical arrangement, the compositions, textures, colors and structures of the formations; but interpolation laterally, between holes, is required. Thus valuable information on coal beds and the contemporaneous rocks is obtained economically.

The graphical representation of a diamond drill record is shown in Fig. 1. The geological section, except for the coal beds, is general and brief.

Primary Objectives

The primary motive for diamond core drilling is to obtain information on the regularity of occurrence, extent, characteristics and quality of the coal beds, but another important object is to get elevations, intervals and depths and use such data in constructing structural contour maps based on the desired geological hori-

zons. In general drilling, barometric elevations and approximate (spotted) locations of holes may be considered adequate, but sometimes holes are carefully located as to both elevations and positions. Invaluable aid, from accurate structural contour maps, is provided in the proper projections for drainage and haulage; this is especially important in thin coal beds which dip steeply. This data also aids in the selection of the most desirable location for the surface plant; if there are no outcrops nearby or no adjoining mines, it is the only available information to use in laying out the mine.

The correlation of a coal bed is sometimes difficult because of changes in the character and thickness within the bed, such as splitting, and changes in the adjacent strata. Some coal beds, like the Pittsburgh, have peculiar and easily recognizable benches and partings. The strata that superimpose and underlie the coal bed (perhaps several feet) usually possess identifying plant and animal fossils. A key horizon, like the Kanawha Black Flint, for example, is always important.

Irregularities in Coal Beds

Coal is sedimentary and coal beds, like other sedimentary rocks, have been disturbed by tectonic forces and fluvial erosion. The disturbances, during and after diagenesis and lithification, have locally altered and even destroyed the formation. The carboniferous river systems afford an interesting example from the latter group of these agencies. Stream channels, cut into the coal beds and associated rocks, were subsequently filled with inorganic rock material; many coal beds are traversed by these winding and irregular channels of erosion and sedimentation, as mine maps and drilling records reveal. A probable result of tectonic action are



Cores provide invaluable means for study of the carbonaceous formations

fissures crossing coal beds and filled with clay. The occurrence of clay veins, the material of which was likely intruded into a plastic state from the roof or floor, is irregular in regard to course, shape and size; they are composed principally of clay, but locally possess nodules of limestone and lenses of carbonaceous matter. Sometimes spurs of coal project into the clay vein; generally the veins cross the coal bed from roof to bottom, but some extend only a few inches into the coal. They are common in the Redstone coal of the Monongahela series.

The extent of a coal formation, like all sedimentary deposits, is controlled by the normal conditions of deposition. The present and original areas may not coincide, as is the case in the Appalachian geosyncline. Coal beds terminate laterally by changing into other types of rock, usually shale, by splitting, by thinning out and by outcropping. The thinned out beds may reappear. The thickness of coal beds vary from lamina to several feet; this indicates the interval and conditions of organic debris accumulation. A coal basin usually possesses several coal beds denoting the repeated return to the environment favoring the occurrence of carbonaceous sediments.

Some Coal Beds Require Intricate Exploration Patterns

It is now apparent that the regularity of occurrence, extent and thickness of coal beds can be predicted only after meticulous examinations

TABLE 1—ANALYSES OF COAL CORE SHOWN IN FIG. 2

Lab. No.	Sample No.	Section		Volatile Matter	Fixed Carbon	Ash	Sulphur	Phos.
1	4 B4 A	Coal, bony	1 in.	32.35	48.96	18.69	0.69	.004
2	4 B4 B	Coal and shale	2 1/4 in.	19.76	29.12	53.12	0.41	.002
3	4 B4 C	Coal, bony	1 in.	36.93	53.89	9.18	1.87	.008
4	4 B4 D	Coal with mother coal	6 3/4 in.	38.94	58.24	2.82	0.88	.002
5	4 B4 E	Coal	10 in.	38.88	57.32	3.80	0.72	.002
6	4 B4 F	Coal, bony	1 1/2 in.	33.02	48.50	18.42	0.68	.008
7	4 B4 G	Shale and fire clay	9 1/4 in.			86.88	0.17	
8	4 B4 H	Coal, bony	2 1/2 in.	31.33	52.86	15.81	0.66	.010
9	4 B4 I	Coal, bony	2 3/4 in.	31.91	58.09	10.00	0.64	.004
10	4 B4 J	Coal	9 1/2 in.	36.09	60.18	3.73	0.74	.002
		Comp. A,B,C,D,E,F,G,H,I,J (45 1/4 in.)				24.56		
		Comp. A,B,C,D,E,F,G,H,I,J (36 in.)		35.64	55.81	8.55	0.76	.003
		Comp. C,D,E,I,J (31 in.)		36.10	59.73	4.17	0.77	.002

are made. This involves both an investigation of the surface geology and diamond core drilling. The plan followed in locating holes in any drilling program is based on the information desired and continuity of the strata; as results are acquired it may be desirable, or imperative, to alter the layout. A true picture of some coal deposits requires intricate patterns of exploration. The locations of the holes should divide up the area as evenly as possible while considering available information from outcrops, mines and previous drilling. Irregular shaped areas may require more holes than regular ones. The map locations are sometimes changed in order to have the actual locations conform more advantageously to such factors as topography and water supply. Care should always be exercised to avoid condemning a good property or approving an inferior one.

Coal cores provide an invaluable opportunity for the comprehensive study of the lithology of the carbonaceous formations. The stratification of bituminous coal beds into benches, a characteristic of sedimentary rocks, denotes a hiatus or change in the conditions of deposition. The benches within a coal bed, therefore, have different chemical and physical compositions and characteristics. Thus a study by benches and by composition is desirable. The range in thickness of partings, interbedded inorganic material, is important; the thickness of a parting may increase until a coal bed must be considered as two independent units. The ash in coal beds was derived from the original organic debris, from eolian deposition and from the waters flowing into the swamp.

The Uses of Coal Cores

The photograph of a coal core and the immediate overlying and underlying strata is shown in the core box in Fig. 2. Also shown are divisions of the coal bed as determined by specific gravity and the float and sink gravi-

ties. The analyses of the benches and by composition of this same coal core is given in Table 1. In addition to the analysis, as shown, the ultimate analysis, B.T.U. and fusion point of ash determinations may be made. In this manner all the pertinent information, relative to a coal core, may be recorded. It is sometimes desirable to cut the coal core longitudinally, using one section for sampling and analysis and saving the other for reference.

Tests to determine removable impurities, such as pyrite, may be conducted on coal cores by crushing to minus one inch, or less, and following the screening with float and sink analyses. Free and other types of

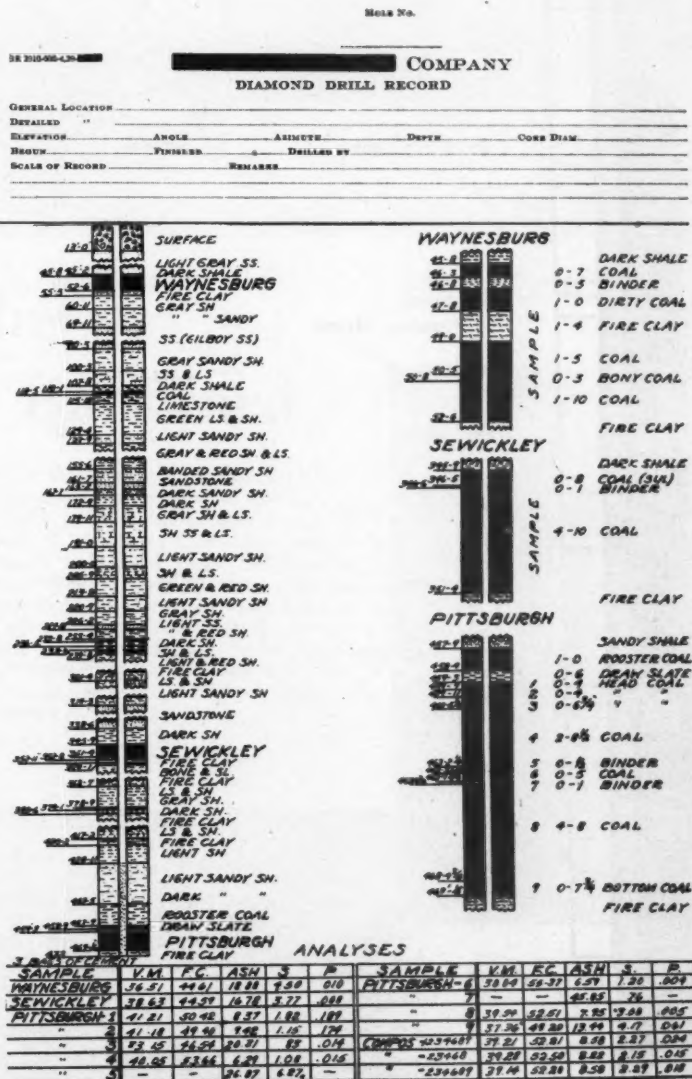


Fig. 1. The diamond drill record is made with great care for permanent reference

JOHN SMITH COAL COMPANY
Smithville, W. Va.

SMITH PROPERTY, KANAWHA COUNTY, W. VA.
Lab. No. C-52386

Shale Top	Sample No.	Specific Gravity	
		Sink	Float
1" Bony coal.....	4-B4-A	1.35	1.40
2¼" Shale and Coal	4-B4-B	1.60	...
1" Bony coal	4-B4-C	1.35	1.40
6¾" Coal with Mother Coal Str.	4-B4-D	...	1.35
10" Firm Coal	4-B4-E	...	1.35
½" Bone	4-B4-F	1.40	1.45
¾" Shale	9¼" 4-B4-G	1.60	
Fireclay streak.....			
8½" Shale		1.60	
2¼" Bone	4-B4-H	1.40	1.45
2¾" Bony Coal	4-B4-I	1.35	1.40
9½" Coal	4-B4-J	...	1.35
Sandy Shale Bottom 45¼" Total Seam			

Sampled by
Commercial Testing & Engineering Co.,
Charleston, W. Va.

Fig. 2. Core of a coal bed with specific gravity record

swelling tests, to determine behavior in by-product ovens, can be made. The experiments with coal cores to assimilate results in the cleaning and preparation of the coal as received from actual mining are of some value.

Mining Data Obtained by Drilling

The rocks associated with a coal bed influence the selection of the method of mining. Coal beds usually rest upon argillaceous materials which locally may be sandy, or, almost sandstone; this formation, commonly called fire clay and ranging in thickness from a lamina to several feet, lies on various types of rock; stigmata are common. The basal member of the strata that superimpose coal beds, considered uniform from a sedimentary viewpoint and containing plant fossils, ranges from the strong and firm type of massive sandstones, through shales, to clay which requires special consideration. Clay is not self-supporting because it absorbs moisture, thereby increasing its volume and weight, and falls; posts alone will not effectively support this kind of roof. Diamond core drilling generally supplies adequate information pertaining to the roof and bottom conditions which will be encountered in the extraction of the coal.

It is imperative that a geologist or engineer be present when a coal core is cut. His duties are: make a hydraulic measurement of the thickness of the coal bed; accept or reject the core; if the core is accepted, then measure and describe it in the fullest possible detail (all of this is done with full realization that the core will be checked by specific gravity tests in the laboratory and recorded as shown in Fig. 2.); see that the core is properly boxed, labeled and delivered to the laboratory.

Good Core Recovery Important

A difference in the hydraulic measurement and the actual thickness of the coal core does not necessarily indicate incomplete recovery. Sometimes the drill will penetrate the coal bed a few inches before the presence of coal is detected. The composition of the strata does not always indicate when the drill cuts into or out of coal due either to the coal being impure or the adjacent formations (like carbonaceous shale or soft sandstone) being about the same in cutting characteristics as coal. If the core is crushed it is probable that some of the coal has been washed away and neither the actual thickness or physical characteristics are represented by the core. Sections in the core, if

(Continued on page 57)



Hamilton Wright Photo

A Coal Mine In Your Backyard—

AN honest-to-goodness coal mine in your backyard—and all the coal you can use free! This one belongs to W. B. Swope, a young business man of Welch, W. Va., in the heart of

West Virginia's bituminous coal fields. The mine is developed to 300 feet in length and the entrance is within 25 feet of the back door. The Swope family operate it on a "helpy selfy basis"—using about 50 tons a year for household purposes only. It's been in the family since 1913 and Mr. Swope says there's enough coal "—to supply my great-grandchildren and their children as long as they live without a penny's cost."

Dumping chute to cellar bin is but a short wheelbarrow haul from the mine



Filling the stoker hopper is an easy task from the convenient coal bin



Coal is accumulated at mine entrance—about a dozen steps from the kitchen door



Swope's coal mine portal is well constructed for permanence



From the first day these students, whose native tongues are Spanish, Portuguese, Turkish, Chinese, hear only English used in the course

★
By H. M. CRAIN

Director, Intensive Course in English
for Foreign Engineering Students
Colorado School of Mines



Mining School Pioneers in Foreign Language Instruction

**Foreign Students at Colorado Mines
Taught Fluent English in 15 Weeks**

FOREIGN students of science and engineering no longer must spend years in American colleges finding their efforts thwarted by a lack of knowledge of English. Young men by the thousands have been coming to our schools from other countries for technical training and have found that the first year or two has been almost a total loss. They have either no knowledge of the English language, or at best, a smattering. Consequently they cannot understand lectures, read texts, take notes, write papers, or ask questions. Even their advanced work loses much of its value, for, although they have picked up some knowledge of the language, their poor training in the basic years prevents a complete understanding of the more specialized courses.

Various methods have been tried to overcome this deficiency. Private



Here is the word "microscopically" in phonetics. The word is printed in the English alphabet on the reverse side of the card

tutors have been employed, or the students have been assigned to classes to audit before enrolling for credit. In general these methods simply wasted the student's time.

Problem Needed New Approach

At the Colorado School of Mines, with its normal enrollment of up to 10 percent of foreign students, the problem had for years been recognized as requiring a new approach at solution. During the past five years it has been apparent that the number of students from other countries that will come to the United States for training in mineral engineering is going to increase rapidly after the war. A marked increase, in fact, is already apparent. Something had to be done to make this training of more value to foreign students, especially because the young men who come to us from other countries return to their native lands not only to practice their profession, but also to translate this country and its customs and philosophy to their fellow countrymen.

About two years ago it was determined that the only practical solution to the language problem was the teaching of English to the foreign student before he began his course of training. In order that the student might not be required to spend excess time previous to his enrollment in his engineering or scientific curriculum, the English training must be intensive.

Investigation of Rapid Language Teaching

The director of the program, with the assistance of members of the department of English and modern languages, undertook research and investigation in the field of rapid language teaching. The Army and the Navy have done much work since the beginning of the war in that field and have had marked success. Other institutions and organizations have also conducted experimentation and formulated programs using new techniques. The objective of the armed forces, however, has been to teach only enough of a foreign language to enable their representatives to make their simple wants known, or, at best, to read newspapers, letters, and diaries, or converse with prisoners. One or two universities have developed short intensive courses to acquaint the foreign student with a fundamental vocabulary.

Virtually all of these programs were investigated, but none provided more than a suggestion of methods

that might be incorporated into the training visualized for use at the Colorado School of Mines.

Teaching a Language Without Translation

In the first place, no course offered went beyond the general vocabulary into the words required for scientific and technical training. In the second place, because of the variety of native tongues represented among the foreign matriculants, it would be necessary to attempt something never before tried: to enroll students of all language backgrounds in one class and teach English to all of them simultaneously without resorting to translation.

The success already achieved is demonstrated by the fact that two classes, the first a frank experiment, have been prepared for entrance into the regular engineering courses of the school on a basis equivalent to that of the North American student. A third class, begun June 1, has a capacity enrollment that includes Turkish, Chinese, Brazilian, and Spanish-speaking South American stu-

him to read his texts, understand lectures, and take notes, recite and ask questions, write required papers, and conduct his daily affairs on a language basis as nearly approximating that of the North American student as possible, it is required that his English vocabulary include, at the end of the course, not only the basic words but also the scientific and technical terms with which our own students would enter the freshman year of an engineering college. Furthermore, he must have the ability, not only to recognize and use the term, but to associate instantly the concept with the English term—to begin to think in English. In analyzing the problem, it seemed to resolve itself into two broad phases: first, the determination of the vocabulary required of the student, and, second, the methods for teaching him the vocabulary and its use.

The first requirement, then, was the fundamental vocabulary. Ready-made vocabularies were investigated, but none approached our requirements. Basic English was suggested as a starting point, but Basic English could not meet our need for several reasons. The most conclusive of its disadvantages to us is that scientific texts are not written in Basic English, nor are classroom activities or everyday affairs conducted in Basic English. Moreover, a vocabulary of 800 words is far from satisfactory even as a fundamental list of words upon which to build the required scientific vocabulary. Basic English did provide a starting point of the commonest words. It was, however, unavoidable that an entirely original word list must be assembled.

The completing of this word list, a major problem in itself, required, in fact, two groups of words merging with each other. One was the basic vocabulary and the other the necessary technical terms.

Compiling the Word List

Two simultaneous projects were begun with these word lists as their objective. One was a compilation of the words that occur frequently in freshman textbooks in use at the Colorado School of Mines. The other was the vocabulary that resulted from the actual writing of the lessons, which was begun at the same time the vocabulary study was projected. These two lists were then collated, and common words that appeared in the texts but had been omitted from the lesson vocabulary were included in a revision of the lessons. In this way, a workable basic vocabulary and a technical vocabulary were assembled.

The Task of Learning a Strange Tongue, Always Important in the Worldwide Mineral Picture, Speeds Up Through Full Use of Newly Developed Techniques. American Mining Engineers Who Plan on Foreign Assignments May Also Sooner or Later Benefit from the Methods Developed at Golden.

dents, who by the middle of September will be competent to take their places in regular engineering courses with no need for special consideration by the instructor. So much success has been apparent and the results are so vital in technical education that the Rockefeller Foundation has granted \$7,500 to support the research and provide equipment.

The course requires 15 weeks, and during that period the students spend eight hours a day in the language class from Monday through Friday. Saturday is devoted to trips to points of general interest and plants demonstrating concepts discussed in class.

But the methods by means of which an instructor, unacquainted with any foreign language (and this is an advantage in the course), makes known to the student, who knows no English, concepts and their corresponding terms in English, and the way in which these terms become a part of the student's thinking may be of interest to the reader.

The broad objective of the course being to provide the foreign student whose native language is not English with a facility in the use of good idiomatic English that will enable

The technical vocabulary was further checked with lists of required technical words submitted by the departments of chemistry, geology, mathematics, physics, and descriptive geometry, courses which the student will pursue during his freshman year.

It may be felt that such phases of the language as grammar, syntax, sentence structure, word order, accent, and intonation are distinct from vocabulary, but, in the final analysis, they are functions of the vocabulary. In other words, their importance, at least to the foreign student of English, whose interest is entirely utilitarian, arises from the fact that without a working knowledge of them he cannot use the vocabulary. They will, therefore, be treated under this heading rather than separately.

Getting the Student Started

Because no foreign words are ever used in the course, and because it is necessary to convey concepts and English words that represent these concepts to a student who is assumed to have no knowledge whatever of the language at the beginning, use is made of opaque-picture-projection equipment and flash cards. Thus, pictures of objects are shown on the screen or the object itself is shown, and, at the same time, cards having the English word printed on one side in the English alphabet and on the other side in the phonetic alphabet, representing the objects, are shown to the student. It is required at the beginning of the course, naturally, that the students must learn both the English alphabet and the phonetic alphabet. The phonetic alphabet used in this course has, however, been simplified to include only 13 characters additional to those found in the English alphabet.

This visual process, almost continuous in the early part of the course, is used throughout the period, as new concepts, difficult to define in the student's vocabulary, are presented.

Attention is given from the first to the student's accurate reproduction of English sounds, and here the phonetic alphabet seems indispensable. The individual student's difficulties will depend largely upon his native language, but, to some extent, the difficulties of the Spanish- or Portuguese-speaking student will be different from those of the Chinese or Turkish student, and all students will have difficulty with certain English sounds. This means that many pronunciation problems are individual ones and will require the personal attention of the instructor, until the ability to reproduce English sounds becomes fixed. For drill in pronunciation of English sounds, use is made of words and phrases having each sound of the English language in

various positions—initial, final, and medial. Preceding the introduction of pronunciation drills, the physiological processes of producing English sounds are studied.

Sound Equipment Essential

For practice, the student uses the sound-reproducing equipment playing disc records that give the recorded pronunciations. These he imitates and records on the magnetic-wire recorder, playing his own recording back for comparison with the sounds reproduced from the disks. Each student has his individual loud-speaker and wire recorder, which he uses in an acoustically treated individual booth. Ten of these booths are in an acoustically treated room.

Necessary for proper speech are, of course, correct accent and proper intonation of sentences. The same kind of drill and practice are required emphasizing these as has been indicated above. Intonation receives especial attention, because the plainest mark of foreign pronunciation is the stress of improper words.

Few formal rules of grammar and syntax are given the student. The proper English usage is taught inductively, as the student realizes for himself that plural nouns take a different form of the verb from singular nouns, or that, when he wishes to express past time, a different form of the verb is used from that used to express present time.

The order of English words gives the foreign student much trouble. To overcome this, patterns are given him, but again chief reliance must be on constant use and drill.

Conversation and Reading

A considerable part of the student's day is devoted to conversations connected with his daily activities. It has been found that through the actual use of spoken English requiring the formation of sentences to express original thoughts and ideas he learns more quickly to put into practice the requirements of pronunciation, grammar, sentence structure, and word order. Conversations are planned so that those words and structures are used with which the student has become familiar, and additions to his vocabulary are introduced carefully and explained thoroughly.

From the first, the student is required to read as much and as rapidly as possible. This requirement becomes successively more exacting, but he is at all times required to read with proper intonation and with a sense of the meaning of what he is reading. The lessons for the first two weeks stress a vocabulary and sentence structure that will enable him to make himself understood in his everyday

life. After the first ten lessons, however, he begins to develop a vocabulary that permits him to read simple, connected discourse, which becomes progressively more difficult. Occasionally he is given sight reading on related subjects. He is also required to read English at home, having provided himself with both a dictionary of American English pronunciation and a translating dictionary.

Beginning with the first days of his course, the student is assigned compositions, letters, and reports to write, and the requirements in these naturally become more exacting as he progresses.

In order to train the student in the transcription of the spoken word in the conventional spelling and to avoid confusion with the phonetic spelling, daily exercises in dictation are included. This is an important part of the course, preparing the student to take lecture notes.

From the foregoing discussion of methods it will be apparent that constant drill is required. To facilitate the individual student's practice, all groups are limited to ten.

Industrial Field Trips

On the first two Saturday mornings the class, accompanied by the English instructors, makes a trip to Denver on the street car, visits points of interest in Denver and Golden, buys meals; and transacts any simple business necessary. All this is done by the student himself, with the instructors present only to try to expand the student's store of concepts and words and to assist him if his difficulty in expressing himself seems insurmountable otherwise. Beginning with the third week, trips are arranged to industries in and near Denver. The week's lessons have been carefully planned to give the class a fundamental vocabulary needed in an inspection of the industry to be visited the following Saturday. The trip gives visual demonstration of concepts and processes introduced during the previous week. Thus, on the third Saturday, an oil refinery is visited; on the fourth and fifth Saturdays, steel plants. On the following Saturdays, trips are made to power plants, oil fields, equipment companies, and similar industries. These are followed by a geology field trip and visits to the departments of chemistry, physics, geology, mathematics, electrical and mechanical engineering, engineering drawing, mining, metallurgy, petroleum, and geophysics, to the assay laboratories, to the library, and to the metallurgical experimental plant. Accompanying the class on these trips, in addition to the language instructor, is a representative of the department concerned, who familiarizes the students



Jose Moraes of Sao Paulo, Brazil, hears the correct English from the loud-speaker and tests his own progress by repeating it back into the magnetic wire recorder for comparison

Basic and Technical Word Selection

In addition to the writing of the lessons, the compilation of the vocabularies, and the gathering of demonstration equipment, hundreds of words have been printed on flash cards both in the English and the phonetic alphabets. All new words introduced into the lessons must be transcribed in the phonetic characters, and for the first ten lessons even the sentences have been thus transcribed. The basic vocabulary, as it now stands, numbers nearly 3,000

with the terminology of the field being studied.

During the week after the field trip the language instructor discusses with the class objects and processes observed the previous Saturday, and the representative of the department inspected may visit the class for an hour or two on the following Monday to explain in more detail or to review some of the processes observed.

Auditing Refresher Courses

At the beginning of the seventh week, the student is assigned to two classes, which he audits for the remainder of the term. These courses are refresher courses and generally will be basic mathematics and chemistry. A student who has had considerable previous engineering training, may, however, be assigned to audit more advanced courses. In these courses he is encouraged to take notes, ask questions, write papers, and begin to conduct himself as though he were pursuing the course for credit. The lessons in the language class are pointed more and more toward the technical vocabulary, and the periods are devoted largely to a coordination with the technical course that the student is auditing.

The actual work of writing the lessons of the course has been a tremendous and exacting task. This will be apparent if it is realized that the course is 15 weeks in length, that 8 hours a day are devoted to the course,

Acoustic treatment makes simultaneous work possible under the instructor's supervision. Each student operates his sound equipment without interference



and that such a program requires a well-planned and accurately written set of lessons for each hour of the day. Every lesson must be carefully planned so that those words and constructions previously brought to the student are used, plus an additional vocabulary and added constructions that evolve naturally from those previously employed. The student must not be held back in his progress, but he must not be overburdened with new words or new constructions. Furthermore, exercises in pronunciation, accent, intonation, word order, and other phases of the course must be carefully thought out and written. The direction of conversation must be planned and the student's writing must be considered.

words, with the technical vocabulary approaching that figure, and, in addition to the compilation, simple definitions and methods of demonstration of each word are necessary. These concrete figures give some intimation of the amount of work necessary for the proper organization of the course. Virtually every word used in the course must be weighed carefully before it is included in the lessons.

Further work which has not been mentioned previously includes the planning of the scripts for recordings, the cutting of records, and the selection of audio-visual aids. In addition, the student's program in the use of sound-recording equipment must be carefully determined in advance.

(Continued on page 66)

CONVEYOR MINING



Conveyors are especially adaptable to thin seams

CONVEYOR mining referred to in this article means the application of belt, scraper flight and shaker conveyors either individually or in combination thereof for the extraction of coal from the working face and its transportation to a central discharge point. Loading onto these conveyors may be done either by hand or by a mechanical loading device.

Other conditions being equal, operators in thinner seams are at an obvious disadvantage in production costs. Recent developments in high capacity mobile loaders and their accessory equipment have tended to increase the difficulties of the thin-seam operator in maintaining his competitive position with respect to production costs.

At various times, during the past 40 years, thin-seam operators have looked with varying success to the applications of conveyor equipment to effect reduction in cost for rock brushing, face transportation and improved performance at the working face.

Progress Will Continue in All Types and Applications of Conveyor Mining, Keeping Pace With Developments in Other Mining Equipment

By H. C. NYQUIST

Chief Engineer, Coal Mines
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Especially during the past 20 years, notable developments have occurred in conveyor equipment. These improvements and developments and the numerous conveyor installations made, are typical of the progress attained in the past and afford a basis for prognostication of at least equally good progress in the future to keep pace with the outstanding job done during the past ten years in the development and application of high-capacity mobile loading equipment and accessories. It seems reasonable

to conclude that the engineering skill employed by both the operators and manufacturers will again prove equal to solving the problems encountered in the use of conveyors and accessory equipment and that with the solution of these problems thin-seam mining will be placed in a better competitive position.

Although there will probably be some notable applications of conveyor equipment in direct competition to mobile equipment in thick seams, the most important field for an increase

in the use of conveyors should be in seams under 42 in. in height where roof to floor clearance becomes a major consideration in the choice of mining equipment. In the writer's opinion the answer to the thin-seam operator's problem can be found by further development of the many types and combinations of the various types of conveyors and accessories presently obtainable.

Many Improvements Indicated

While steady progress has been made in development of the three principal types of conveyors, the desirability of many improvements is still clearly indicated particularly in mining plans and in accessory equipment before some of the major problems now encountered, in making application of conveyor equipment, can be considered satisfactorily solved. Some of the improvements which will probably be realized in the not very distant future are here listed, as follows:

1. Conveyor Concentration.

Belt conveyors will probably be used even more extensively as mother conveyors because of their high capacities, so necessary for concentrated production. Face conveyors will probably be either belt or scraper flight, loaded mechanically with small mobile loading machines, or shaker conveyors self-loaded with duckbills or small mobile loading machines. No matter what type of conveyor combination, concentrations to form compact operations capable of producing tonnages up to 600 tons per shift at single discharge points, seems to be clearly indicated.

2. Mining Plans for Conveyor Concentration.

Mines will probably be engineered to produce their forecasted production from as limited an area as possible. Rock work will be kept to a minimum by brushing only main entries. Mother belts will gather the coal from concentrated face conveyors and discharge it into large mine cars.

The mining plan will probably be very thoroughly detailed, showing exact day-by-day sequence of face cuts and precise scheduling of the movement of equipment from one face to another in order to avoid loss of production while face equipment is in transit. This will be necessary, both in mines where pillars are drawn and where pillar fenders are not removed.

Sufficient extra mother conveyors should be on hand and installed on development of new panels to prevent any loss of production when shifting crews from one panel to another.

3. Belt Conveyors.

One of the major objections to belt conveyors at the present time is the cost of handling conveyor sections under low roof during installation and the recovery when a panel is completed. Belts can and probably will be designed so that the extension and recovery of belt sections can be made just in by the discharge section. A belt so designed will overcome a present difficulty in the use of belt conveyors in thin seams.

4. Scraper Flight Conveyors.

Among the improvements which will probably be made on this type conveyor are a drive section that can be easily moved and a satisfactory

past ten years, further improvement in design will probably be made in order to make them more easily handled under low roof conditions. Accessories will probably also be developed to make them more satisfactory mechanical loaders for pillar recovery.

7. Conveyor Accessories.

Conveyor accessories, in the past, have been given some attention by designers but not sufficient to develop some items very desirable for highly concentrated conveyor mining. Some of the important conveyor accessories which will probably be designed or improved include the following:

7.1. A simple and sturdy self-con-



Room conveyors loading onto a gathering belt

hopper in which mobile loaders can discharge without undue spillage or distraction of the attention of the loader operator.

5. Shaker Conveyors.

Shaker conveyor drives will probably be designed so that the drive will be semi-mobile, permitting the drive to be quickly shifted from one location to another. Designers will probably also perfect an improved pan fastener for the purpose of reducing labor costs for the installation and recovery of pan lines.

6. Duckbill Loaders.

Although duckbill loaders have been progressively improved during the

tained and portable switchboard with suitable connections to all motors in the unit.

7.2. Methods of communication between the working face and a central point, to eliminate loss of productive time now due to traveling under low top.

7.3. Safe and efficient means of transporting men and supplies between the main entry and the working face.

The realization of the above improvements is considered attainable by our engineering skill, and would tend to improve face costs in mining thin seams by conveyors wherein apparently lies the major field of application of conveyor mining.

More About Metals and Minerals In Postwar Economy

The World Outlook in Metals and Minerals, the Effect of Scrap on Some Important Metals, and Pertinent Comments on Aluminum, Magnesium and Petroleum

By JOHN D. SULLIVAN

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LAST year I had the pleasure of giving a paper on the role of heavy metals in postwar economy[†] before the Joint Meeting of the Colorado Mining Association and the American Mining Congress. I shall deal with the same general subject which I discussed last year and shall attempt to cover the effect of scrap in the postwar period on some of the more important metals. I also shall make some comments on aluminum and magnesium, which were covered by a different speaker last year, and on the world outlook on the supply of another important mineral, crude petroleum.

Last year's paper stated that when production would level off in the United States in 1944, we would have the capacity to produce about 110,000,000 tons of basic metallic and nonmetallic engineering products. This production capacity goal has been reached. The iron and steel industry is about 85 percent of the total; aluminum and magnesium combined about 1.3 percent; copper, 1.3 percent; lead and zinc, 1.8 percent; plywood and synthetic rubber slightly under 1 percent each; glass about 8 percent; and organic plastics about 0.2 percent. Again, I wish to call attention to the enormous size of the glass industry. On a tonnage basis, it is about the same size as aluminum, magnesium, copper, lead, zinc, plywood, synthetic rubber and organic plastics combined. On a volume basis, it is about one-fourth the size of all steel ingot capacity. It is interesting to remember that glass is the oldest and largest plastic indus-

try. Glass is a thermoplastic inorganic resin. On a weight basis it is some 40 times as large as all organic plastics combined. It is made from raw inorganic minerals and salts, all of which are domestically produced; the chief ingredients of common glass being sand, feldspar, lime and soda ash.

The thesis which I developed last year was that an analysis of the past and present can lead to only one conclusion, i.e., to satisfy human wants the future civilian requirements of virtually all of the heavy metals will increase. Our future metal consumption must be viewed by what our consumption of the past has been, and on the general trends of consumption. In 1870 the world's production of major metals was only 13 million tons, whereas in 1940 it was about 260,000,000, and it is much larger today with wartime production. The world's copper production was only 150,000 tons in 1880; in 1942 it was estimated at 2,600,000 tons. In 1944, the copper smelter production in the United States alone was about 1,000,000 tons.

I see no reason to change the opinion expressed last year that there will be a heavy demand for most basic metals after the war. With our expanded industry, with highly efficiently operated plants, and with manufacturing and marketing know-how, we should be in an excellent position after the war. Domestic civilian consumption of metals has been cut to a low figure and because there seems to be no reason to expect that it will not be cut even further, until at least one phase of the war is finished, replacement demands will be high. We have plenty of available money in the country to pur-

chase goods to satisfy human wants when consumer goods again become available. We are a manufacturing nation and depend in part for the maintenance of our standard of living on importing raw materials from foreign countries, and smelting, refining and fabricating products which are returned in part to the countries from which the raw materials originated, or we repay with fabricated products resulting from our own domestic resources. We have, therefore, not only an enormous postwar domestic need to fill, but also a huge potential foreign market. It is hard to predict postwar markets in the Far East, but the prewar per capita annual consumption of manufactured goods imported from the United States gives a picture of what the potential market may be. Our per capita exportation to the Philippines was \$5; to Japan \$4; to China, only 25 cents.

Production in 1944

Our wartime production of metallic products leveled off in 1944 and in fact, because of the changing demands of war, decreased in many cases. Preliminary figures for 1944 in comparison to 1943 are:

	1944	1943
Mineral fuels...	\$5,254,000,000	\$4,589,000,000
Metallic products	2,377,000,000	2,438,000,000
Nonmetallics ...	912,000,000	974,000,000

On the whole declines rather than gains were recorded for most of the metal group, including aluminum, bauxite, chromite, copper, most ferroalloys, gold, iron ore, lead, mercury, molybdenum, silver, tungsten, vanadium, and zinc. Gains were registered by beryllium, cadmium, manganese ores, pig iron, nickel and platinum. All fuels showed gains, and most nonmetallic minerals used in war industries also gained, whereas those more related to civilian consumption decreased. Among the latter were cement, clay products, peat, sand and gravel and slate and stone.

It would appear that the government has adopted a policy of concentrating on the production of only those metallic products essential to the war effort. Because of the present manpower shortage, which will become more critical rather than easier, there seems to be no reason to expect a relaxation of present production restrictions. We can expect, therefore, that in 1945, except in a

[†] Paper delivered at 1945 meeting of Colorado Mining Association, Denver, Colo.

[†] Sullivan, John D., Role of Heavy Metals in Postwar Economy; Mining Congress Journal, Vol. 30, March, 1944, pages 29-34.

few specific cases, there will be no marked increase in metal production, and in some instances a further decrease will be effected.

Scrap

Metals are made from ores and secondary metallic products, better known as scrap. The importance of scrap may be overlooked by men primarily concerned with the mining of ores. An executive of a copper company a few years ago estimated that the average time for copper to return to the smelter in the form of scrap was about 21 years. It can be appreciated that in many instances our largest "mines" are in potential scrap.

Steel is the largest tonnage consumer of scrap. In a normal prewar year the open-hearth industry operated in the United States on a charge consisting of approximately 50 percent each of pig iron and scrap, the latter being about half shop and half purchased. In some local districts, the scrap was as high as 80 to 90 percent of the entire charge. The bulk of the steel industry in the East had a rather flexible range and the percentage of scrap varied depending on scrap supply and price. When scrap prices went up, more pig was used, and as scrap consequently accumulated its price decreased and more of it in turn was used at the expense of pig. During the war, it has been necessary to build blast furnaces to produce more pig iron because of the shortage of scrap. By duplexing in Bessemer and heavy oreing of the open-hearth charge many plants have been able to operate with charges containing substantially less than 50 percent of scrap.

Copper is another example of an industry using a large amount of secondary metal, although to make electrical grade metal it ordinarily goes through a refining process, including an electrolytic refinery. In 1942, the smelter production of primary copper in the United States was 1,087,991 short tons, and the production of secondary, including brass and bronze, was 927,755 tons of contained copper or 85 percent that of the primary.

In 1942, the primary refinery production of lead from domestic and foreign ores was 566,839 short tons, and the smelter production of secondary was 323,000 short tons, or 57 percent of the primary.

Zinc, likewise, had a substantial secondary production. In 1942, it was 330,526 short tons as contrasted with 891,872 tons of primary production from domestic and foreign ores. This is 37 percent of the primary. However, of this only 81,447 (9 percent) was recovered as zinc metal, the largest recovery being in the form of brass and bronze.

In the nonmetallic fields, glass uses cullet (broken glass, etc.) as scrap,

and grog (burned clay or crushed brick) is used in the manufacture of many clay products, particularly refractories.

Scrap, therefore, has a dual significance in this discussion. First, in the manufacture of certain products such as steel and glass, it is essential; second, from the mining viewpoint, flooding of the market with certain metal scrap may mean decreased mining activity. A large supply of scrap can be harmful for a limited period to the mining industry and again it may be a blessing if we are short of domestic reserves or if, because of wartime exigencies, mining production has gotten ahead of development. Ex-

Scrap Supply

It behooves us, therefore, to consider the scrap situation for a few basic metals. Any consideration, however, must be based on the assumption that the Allied Powers will win the war and that hostilities will cease within a reasonable time.

Iron and Steel

Although we produced some 89,000,000 short tons of steel in 1943 and had an estimated production of 90,000,000 in 1944, the bulk of it is going into wartime industry, and much of it into instruments of war such as tanks, guns, ships, and plants producing war goods. Much of this steel will never



—Photo, St. Joseph Lead Co.
Stope in S. E. Missouri lead mine. Postwar demands for lead lie in automobile batteries, cable coverings, tetraethyl lead, solder, pigments, bearing metals, etc.

amples of the benefit of a supply of scrap, if in a useable form, are aluminum and tin where domestic ore reserves are small or lacking, and zinc because an unprecedented mining activity during the war has cut heavily into the reserves. On the other hand, a large supply of copper scrap might have an immediate adverse effect on copper mining activities.

return to the United States metal market in the form of scrap. This is particularly true of war weary scrap from the battlefield and sunken ships. Maritime vessels will not be scrapped in the immediate postwar period and it is unlikely that our large buildings constructed for war purposes will be dismantled. The supply reservoirs of scrap in the United States are going

down and down. Before the war the sale of a new automobile meant scrapping of an old one, but this will not be true in the immediate period after the war. We are talking about making 6,000,000 autos a year as contrasted with a pre-war peak of about 4,000,000. We now have a shortage of cars; so only those that no longer can be made to run will be turned in for scrap for perhaps 2 or 3 years after we return to a peacetime economy. It would appear that we shall have a deficiency of iron and steel scrap for some time after the war. This is not too serious, except in so far as it affects iron ore reserves, because we have ample blast furnace capacity to produce pig iron and we have learned how to employ higher pig iron to scrap ratios in the open-hearth furnace and have increased facilities and better techniques for the production of Bessemer steel.

Aluminum

Aluminum presents one of the most serious scrap problems we have to face in the post-war period. Production of virgin metal went up by leaps and bounds to meet war requirements. In 1937, a typical pre-war year, production of primary aluminum in the United States was 292,681,000 pounds; in 1943, it was 1,821,200,000 pounds, a 6-fold increase. Even in 1940 production was only 412,560,000 pounds. Production decreased to 1,555,000,000 pounds (preliminary) in 1944. It has been estimated that the aluminum in war weary and surplus airplanes which will be scrapped by and at the end of hostilities may amount to about 2,500,000,000 pounds or nearly 9 times the consumption of primary in 1937 and 6 times that of 1940. Aluminum scrap is not cheaply refined as is copper, for example, and the problem of utilization of the huge quantities of scrap presents a problem to American industry. Because of its availability and probable relatively low price, new fields of industrial use, particularly castings, will be opened.

Magnesium

Magnesium production has been cut back because of the decreasing war demands. We, nevertheless, have tremendous quantities of primary metal in stock. Fortunately, secondary magnesium has not been a serious problem and accumulation of scrap by the end of the war is unlikely. Most magnesium is used to alloy with aluminum or in directly expendable war uses such as tracer bullets and incendiary bombs. The latter uses have sufficed to consume current scrap. Any large use of magnesium in civilian life depends on development of magnesium alloys with proper volume-strength ratios and still with resistance to corrosion, particularly stress corrosion.

Copper and Zinc

The war brought about marked changes in the uses of copper and zinc. As an example, the percentages of the total zinc, by uses, for 1937, a typical pre-war year, and 1943, a war year, were:

Use	1937	1943
Galvanizing	42	32
Brass	28	50
Rolled Products.....	10	6
Die Castings	14	9
All Other	6	3

The large amount of copper and zinc going into cartridge brass indicates that, if battle scrap is returned to this country, we shall have quite a supply of secondary to deal with. Also, there will be considerable quantities of brass in munition "pipe lines" at the close of hostilities. Used cartridge cases *per se* have limited direct use as wrought brass because ordinarily they contain a small amount of lead and antimony as contaminants. When such scrap is melted the content of these impurities may be so high as to cause difficulty in subsequent rolling. Usually the content of lead is too high for hot rolling, but ordinarily it is all right for cold rolling. It is, of course, possible by smelting and refining to reclaim virtually all of the copper from such brass, and in some plants substantial quantities of the zinc would be reclaimed from the dusts collected. Used cartridge case brass is satisfactory for most casting purposes.

Probably most of the electric motors to be made for wartime use will not be scrapped in the immediate post-war period. These may be turned over for consumer demands.

Although it would appear likely that there will be considerable copper scrap after the war, zinc scrap other than brass probably will be none too ample. Brass and bronze, before the war, was the chief source and form of zinc scrap. In 1942 the recovery of secondary zinc as metal in the United States was 81,445 tons while that recovered in other forms was:

Recovered in	
Zinc base alloys.....	3,670
Brass and bronze.....	212,038
Aluminum base alloys...	18
Chemical products.....	33,355
Total	249,081
As Metal	81,445
Total	330,526

Noteworthy is the fact that galvanized steel, which before the war was principal consumer of zinc, was not a contributor to the secondary zinc supply.

Tin

While our tin supply is still ample for all wartime needs we are annually consuming more than we are getting

from imported ores, imported metal and secondary sources. There will be a limited scrap supply after the war. We are using substitute solders and employing as light a weight of coating on containers as possible. Tin is virtually gone from collapsible tubes.

Lead

Lead production decreased from 405,000 tons in 1943 to 385,000 tons in 1944. Today, however, we have a lead shortage in this country. With unusual military demands the decreased production of 1944 is already reflected. Ordinarily secondary lead comprises a substantial part of the entire production. In 1937, it amounted to 59 percent of the primary production from domestic and foreign ores; 50 percent in 1939; 70 percent in 1941; and 57 percent in 1942.

In 1937 the four largest uses of lead by percentages, of the total consumption were:

Storage batteries	28.3
Cable covering	13.2
White lead	12.7
Red lead and litharge.....	8.4

The four largest users in 1943 were:

Storage batteries	23.4
Ammunition	16.2
Cable covering	12.0
Red lead and litharge.....	7.2

In 1943, the consumption of lead in the form of tetraethyl lead was 63,000 short tons, or nearly 6 percent of the total.

With the great demand for automobile batteries, tetraethyl lead, solder, paints, bearing metals, etc., the market after the war will not be flooded with lead scrap.

Steel Alloying Constituents

Because these are for the most part consumed, there will be no excess scrap of ferroalloys. Many, however, build up in scrap and by present methods are reused in low alloy steels.

Summarizing

It would appear that our greatest shortages of scrap will be in tin, and iron and steel. The greatest excess will be in aluminum and magnesium, if present stockpiles of the latter primary metal can be classed as "scrap." Aluminum scrap, however, must be viewed in a different light from iron and copper scrap. Although the latter can be cheaply processed to go back in "primary" uses, most aluminum scrap is used only in a less pure form than primary, is in some types of castings, or it is used in conjunction with a sufficient amount of primary metal so that the overall product is not too high in impurities. In other words, it is upgraded by the use of primary, and the amount that can be so used depends on the content of contaminants and the end use. There will be ample supplies of copper scrap in the form of metal and alloys. This may

be serious enough to be reflected in mining. Zinc scrap, other than brass, likely will not be available in any too large quantities and the same would appear to be true with lead.

Petroleum Supply

As pointed out earlier, production of all fuels in the United States increased in 1944 over 1943. The value of crude petroleum for 1943 and 1944 was \$1,828,000,000 and \$2,061,000,000, respectively. The production in 1944 was 1,678,000,000 barrels. The rapid production from domestic resources has put a question in the minds of the majority of residents of the United States as to what the future supply situation is likely to be.

Petroleum "reserves" is an abused term but to petroleum geologists it is a definite expression of the known and proved reserves capable of being extracted from the ground by known and currently used production methods. It more or less corresponds to proved and developed ore in metal mining. Reserves refer only to pools of oil in the ground where wells have been drilled and the probable quantity of oil determined by established methods.

Petroleum has been found in quantity only in certain types of sedimentary deposits, usually a stratigraphic sequence of sandstone and

shale or limestone and shale. From a knowledge of the earth's surface and the percentage of it composed of sedimentary deposits of the type which might produce petroleum in commercial amounts, geologists have estimated the probable or possible amount of petroleum that exists and which eventually can be discovered and mined.

Up to January 1, 1944, the world had produced approximately 39,000,000,000 barrels of crude oil. Geologists estimate that the world's supply of petroleum, including that already removed from the ground, is on the order of 700,000,000,000 barrels of which about 100,000,000,000 barrels or 1/7 is in the United States. In general it may be said that we have already produced nearly 30,000,000,000 barrels of oil in the United States; we have reserves of 20,000,000,000 barrels or more, and probable undiscovered deposits of perhaps 40,000,000,000 to 50,000,000,000 barrels.

Foreign Supplies

The world's largest reservoirs of oil can be divided into a few major regions.

(1) The Near and Middle East

This area includes the deposits near the Persian Gulf, the Black, Red, Caspian, and Mediterranean seas. It is the

site of the greatest petroleum resources so far discovered in the world.

(2) Gulf of Mexico and Caribbean Sea

The oil fields of Trinidad, Venezuela, Colombia, Mexico and our Gulf Coast are in this area.

(3) The Far East

The field of the Dutch East Indies, Borneo, Sumatra, Java and New Guinea.

(4) Arctic Circle

The basin surrounds the North Pole, is occupied by the Arctic Ocean, and is between the continents of Asia, Europe and North America. Possibly at some future day petroleum in quantity may be found in Alaska.

While other United States fields, such as the Midcontinent and California, are important they can not be classed as major regions. The same is true of other scattered deposits throughout the face of the globe. These fields, nevertheless, have produced and will continue to produce substantial amounts of petroleum.

At the present rate of consumption the United States has perhaps 15 years' supply of proved reserves. We might also guess, on geological



A Minnesota open pit iron mine. Deficiency of iron and steel scrap would necessitate considerable blast furnace production of pig iron from iron ores to meet operational needs

grounds, that at least another 25 to 30 years' supply will be found in as yet undiscovered fields or areas, or a total of 40 to 45 years, although it probably will not all be discovered in that period. Domestic oil is likely to be harder to find and more expensive to produce. We have scarcely scratched the surface of the foreign supply.

When the United States starts to import petroleum on a large scale, provided present international boundaries and political setups remain, we likely shall depend largely on two sources: (1) The Persian Gulf area and (2) the Caribbean area, particularly from Venezuela and possibly Colombia. Because of climatic conditions it is not expected that the Arctic Circle deposits will be used in the immediate future. Before the war the United States put a protective tariff of 21c per barrel on crude oil imported into this country. Either Venezuela or Persian Gulf crude oil can be laid down at Eastern United States seaboard at a cost as low as and probably lower than East Texas crude can be laid down at the same point. It is also conceded by many major oil companies that Persian Gulf crude oil can be laid down in the United States Pacific Coast ports by tanker at a cost as low as or lower than California crudes can be distributed to the same points.

The prewar cost of transporting crude petroleum averaged 1 mill per ton mile by tanker, 3.2 by pipeline, and 8 by railroad tank car. Bigger and faster tankers have been built during the war.

The "ownership" of foreign deposits is important to our economy and American petroleum producers, like metal mining companies, have looked to foreign sources as our domestic deposits declined. It is, of course, impossible to predict what world politics, agreements, cartels, future wars, etc., will do with petroleum supplies and ownership. The prewar ownership of major proved reserves of petroleum was:

<i>Deposit in Country</i>	<i>Predominant Ownership</i>
United States	United States
Middle East	United States, British, French
Russia	Russia
Venezuela	United States, British
East Indies	Dutch, United States, British
Mexico	Mexico
Colombia	United States

Synthetic Petroleum Products

Although the supply picture for crude petroleum is very bright, cognizance should be taken of other potential sources of supply or petroleum end products.

Natural Gas

Natural gas is a potential source of petroleum products. It is possible, for example, to employ the Fischer-Tropsch process to convert it to petroleum. Our reserves of natural gas (i.e. proved wells) have been estimated at 85 to 110 trillion cubic feet (1.5 to 1.9 billion tons). This would furnish the equivalent of 1,400,000,000 barrels of crude oil per year for some 4 to 5 years, if no additional discoveries are made. Although natural gas might be the cheapest source of synthetic petroleum it is doubtful if the Government will permit diversion of natural gas, which is essentially needed in other industries, to the manufacture of petroleum.

Oil Shales

It is estimated that we have a potential supply of 92,000,000,000 barrels of recoverable oil from various oil shales in the United States located largely in the West, particularly in Colorado and Utah. At a production rate of 1.4 billion barrels per year this supply would last some 65 years. The United States Bureau of Mines has resumed the work recessed about 20 years ago on production of oil from oil shales. The technical feasibility of extracting petroleum from the shale has been demonstrated. The chief obstacle is one of cost. It is necessary to mine on the order of 2 tons of shale per barrel of oil produced. It is estimated, by M. J. Gavin, Petroleum Administration for War, that it would cost \$2 to \$2.50 per barrel of crude oil produced, unless cheaper mining methods are developed. The retorting cost alone is estimated at 50c per ton of shale, but cheaper processing methods may be developed.

Tar Sands

Tar sands are another large potential supplier of petroleum. Production from sands would probably be more costly than from shales.

Coal

Coal reserves in the United States are enormous, and coal can be converted into petroleum products either by hydrogenation, such as by the Bergius process, or by gasification and synthesis by the Fischer-Tropsch process. We have sufficient coal in the United States to supply 1.5 billion barrels of oil per year plus present coal needs for 1,000 years. Synthetic liquid fuel from coal is a long way in the future because it can not compete economically with natural petroleum.

Germany has been getting perhaps half of her total petroleum products during the war by synthesis from coal. Presumably, most of this is being produced by the Fischer-Tropsch process although the Bergius hydrogenation process may also be in use.

Cost has been of secondary importance in the German war economy.

Summary

The United States is a metal consuming nation. We also are a manufacturing nation. Civilian consumption has been seriously curtailed during the war although the American's purchasing power has increased. As the war goes on, obsolescence and wearing out of equipment and parts become more serious. Even now we have tremendous human wants to supply and the longer the war goes on the more serious they become. To maintain our standard of living we are going to strive not only to hold those foreign markets which we had before the war but to expand them and get others. I have no reason to change the opinion I expressed here a year ago that the post-war picture for metals is extremely bright.

The scrap situation will be a problem to some industries after the war. The large amount of aluminum scrap may be serious although because of the limited uses of most types of scrap available it may not affect the picture of primary production too much. It is not to be expected, however that in the immediate post-war period primary production will approach the wartime peak. Were it not for our blast furnaces the shortage of steel scrap might be felt. In any event it will mean the drawing on our reserves of domestic high grade, cheaply mineable iron ores. There is likely to be an excess supply of some types of brass scrap, but there should not be an excess of other types of zinc scrap or of lead scrap. It would appear that the supply of copper scrap will be ample.

Our American industry can depend on an adequate supply of all petroleum products in the post-war era.

Construction in Postwar Period

CONSTRUCTION programs announced by private enterprise and provided for by the Federal Government, now total approximately \$21,000,000,000, H. E. Foreman, managing director of the Associated General Contractors of America, declared recently.

"Private construction programs that have been publicly announced total about \$6,000,000,000 and the public programs about \$15,000,000,000," he explained. "Most of these programs cover periods of from five to 10 years."

Construction programs total about \$750,000,000 as announced by automobile companies; \$150,000,000 by chemical and paper companies, \$300,000,000 by the theatrical industry and by colleges and universities, and about \$260,000,000 by a miscellaneous group of productive industries. Utility companies have the largest program.



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Gardner-Denver CF89H Drifter—Feeding pressure remains constant at all times, regardless of rate of penetration. Feeding action is continuous. Result: High drilling efficiency.

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Gardner-Denver "Big Bite" Loader—The G-D-9 Loader has more power to crowd into the muck pile—a faster lift and a faster discharge. It's a safe loader, too, with its low center of gravity.

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Gardner-Denver Class "WB" Air Compressor—Occupying only five square feet of space, these vertical water-cooled compressors operate at efficiencies comparable to larger two-stage horizontal machines.

Gardner-Denver Class "HA" Air Compressor—For heavy-duty continuous operation. Timken roller main bearings—cushioned duo-plate valves—cut maintenance to a minimum.

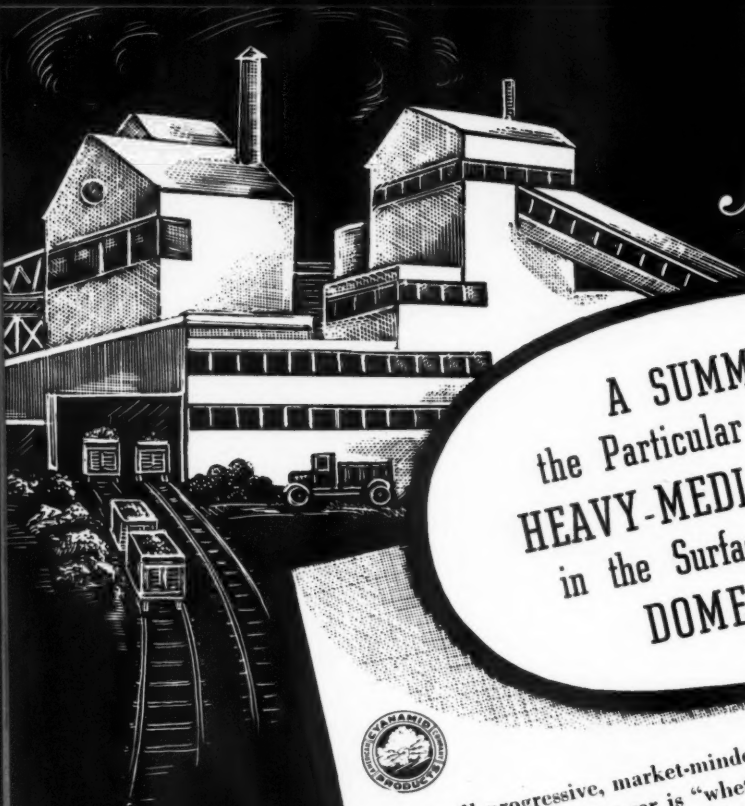
Gardner-Denver Drill Steel Sharpener—Lower cost per steel—lower drill maintenance on any job. These are the reasons why Gardner-Denver Drill Steel Sharpeners are so widely used in mining operations.

For full information about the Gardner-Denver mining line, write Gardner-Denver Company, Quincy, Illinois.



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Since 1859



Not "Whether"
but - "Why"

A SUMMARY OF
the Particular Advantages of
HEAVY-MEDIA SEPARATION
in the Surface Preparation of
DOMESTIC COAL



To all progressive, market-minded domestic coal producers the question no longer is "whether to clean" but "how to clean *most effectively and efficiently*".

Cyanamid has demonstrated that Heavy-Media Separation has many outstanding advantages over existing methods of coal preparation, particularly in the treatment of coal containing a relatively high percentage of near-gravity material and where the percentage of waste material is high. These advantages stem from inherent fundamental principles:

1. Because Heavy-Media Separation operates at equal efficiency of separation at any pre-selected gravity from 1.25 to 3.4, it can be used with equal effectiveness on bituminous, semi-bituminous or anthracite.

Heavy-Media Separation depends for its efficiency upon the immutable law of gravity rather than upon the hard-to-control dynamics of moving bodies in moving air or liquids. Once the medium gravity is set, it can be maintained within ± 0.01 gravity, or easily and quickly altered to meet changed characteristics of feed coal.

No other process can achieve continuously the same accuracy and flexibility. The superiority of Heavy-Media Separation is particularly evident in the treatment of feed coal having a high percentage of near-gravity material at the separating-gravity desired.

AMERICAN CYANAMID COMPANY
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"How Best to Prepare Domestic Coal"

2. Heavy-Media Separation plants can be designed to give multiple-product separation from run-of-mine feed coal in a full size range without presizing to meet any established or future standard for any coal market.
3. By continuous reclamation of the low-cost medium from both clean coal and refuse, medium loss is negligible.
4. Plants can be started and shut down quickly and easily without bank loss of coal or medium and with no loss of efficiency. Loss of coal or medium due to variable moisture-content of feed is no longer a problem.
5. The equipment used in Heavy-Media Separation plants is standard and time-proved milling equipment. Plants now operating and planned for prompt construction have a capacity of over two-million tons per month.

Continuous-unit testing on coal and many years of Heavy-Media Separation experience on millions of tons of metallics and non-metallics confirm the literal exactness of the above statements. We are prepared to demonstrate the applicability of Heavy-Media Separation on your coal by continuous-unit tests in carload lots, and also to assist in the design of Heavy-Media Separation coal-cleaning plants. We welcome inquiries from coal mining companies and their contracting engineers, as well as others interested in more efficient coal-preparation.

If you have not received a copy of Ore Dressing Notes #13, describing Heavy-Media Separation with particular reference to coal preparation, we will be glad to send one without cost or obligation on request.





Ways to Cut Grinding Costs

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Longer service life of Sheffield Moly-Cop Balls will give you many more tons of ore ground than the average forged or cast steel balls.

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1. Lower cost of grinding media per ton of production.
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All these add up to more profit per ton of metal recovered — more low grade ore ground profitably.

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Pre-Employment—Supplementary and Supervisory Training



The tunnel class at Logan County Mining School is carefully instructed in fundamental mining tasks under guidance of experienced mining men

THE PRESENT need for training in coal mining has become extremely urgent although it has generally been sadly neglected as we have progressed during the last 15 years into the mechanical mining era. The reason for this neglect may possibly be an ever abundant labor supply. Coal companies in planning mechanization programs, however, have generally neglected the one main important element, namely: *the human element*. A company, after installing mechanized units, too often finds that something very important is lacking: *efficient personnel trained to prevent breakdowns, delays, confusion or anything that would contribute to slowing down of the coal mining process.*

To overcome this difficulty coal companies have two alternatives: import trained men or resort to a training

Presented to the joint meeting of West Virginia Chapter of American Institute of Electrical Engineers and New River and Wind-ing Gulf Electrical and Mechanical Institute at Beckley, W. Va., April 12, 1946.

A Careful Approach to the Miner Training Problem Will Assuredly Result in Many Improvements of Lasting Benefit to Employee and Employer Alike

By L. H. WINGER

Supervisor of Employment and Training
Island Creek Coal Company

program of their own. To import men is not only expensive, but one will find that there are not enough trained men to meet the demand. The working force must be built up at the same time that equipment and materials are being provided. To get a sufficient number of workers into action quickly a definite training program is needed. Coal mining in the past has been characterized by a father-to-son apprentice training, where standards have been set upon

individual performance rather than upon a unit or group basis as we have established them today. The ultimate success of mechanical mining production depends upon the cooperation and coordination of all of the employees. In order to obtain this cooperation we must educate and develop prospective employees so that they will develop a competitive spirit of enthusiasm, and a desire for high individual efficiency. Our foremen, and consequently, the men under them must be

endowed with that vital spark known as the "right spirit." This spark may be either strengthened or weakened, depending upon the ability and tact of the foremen.

It therefore appears that the most practical and logical solution for a coal company is to set up a training system adapted to meet its own problems. To do this one will have to analyze the training requirements to meet the needs of any one individual company.

Well Trained Instructors Needed

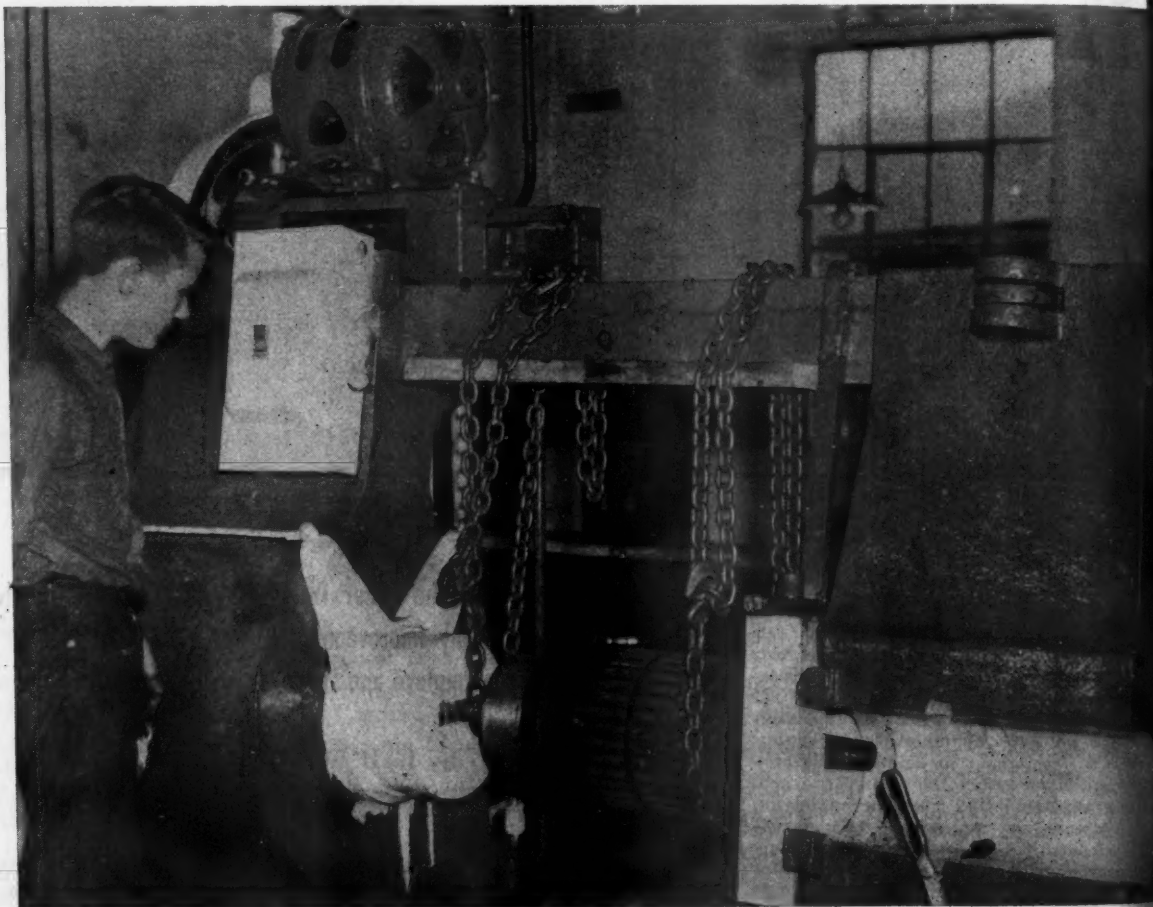
We do not want to make the same mistakes that have been made by some of our educators—that is, to copy systems and methods that have

not do the job as it has to be done. Properly organized and intelligent instruction from instructors who are trained and qualified to do this work is also required.

Each company operates with the aim of having key men in each department who supervise the procedure of others to attain the highest possible efficiency within their departments. To do this each individual employe must be highly trained himself and one who can train those employes who work for him. It would require a very elaborate and expensive training program to train each individual workman efficiently. It is possible, however, with a reasonable layout, to establish a training program for the key men, who when trained, will pass on their informa-

Plenty of Understudies

To the coal industry this is a new and relatively undeveloped phase of personnel work, but we believe it will more than pay for itself in finding supervisory and productive talent and at the same time place mining positions upon a more competitive basis. Both theoretically and practically it would then be possible for any one individual to drop out of an organization without wrecking or seriously handicapping its operation. A sound personnel plan calls for having understudies for all important positions, so that, when a key man is separated from the organization, all that is necessary is for the understudy to move up one notch in the company's plan of organization. As an incen-



The operation and use of the hydraulic press is covered in a pre-employment mine maintenance class

been developed by other industries and apply them without making the proper adjustment to adapt them to fit our own needs. Training must be made to fit the industry in each locality and this pattern must meet the local needs of management. Equipment and students alone will

tion and knowledge to their workmen. This will tend to improve working habits, safety, efficiency and in every way develop much more desirable and reliable employes. Instruction and supervision are one and inseparable, *no man can be a good supervisor without being a good instructor.*

tive, the company's policy with regard to each employe's promotion should be made clear to each individual and be honestly administered if and when they are qualified and the opportunity arises. Training and promotion of an employe is a very expensive process under the most favorable conditions

and if one should make the wrong selection as to the individual in question it places the company in a rather embarrassing position. Correct selection of employees is just as essential as the training program itself, just as we realize that it requires good lumber to construct well-built houses.

How to Set Up a Program

To set up a training program based on these premises one must first consider each branch of the mining industry, namely: production, maintenance, and management. In all probability the logical manner in which to attack this problem would be to plan a program that would provide a separate course of study for each branch of the mining industry, and at the same time be elementary enough so that it would apply to any employee that might be interested in his advancement with the company.

Factors that should be considered when building this program are: (1) who shall be given the training, (2) how shall the classes be conducted, (3) what material is necessary and

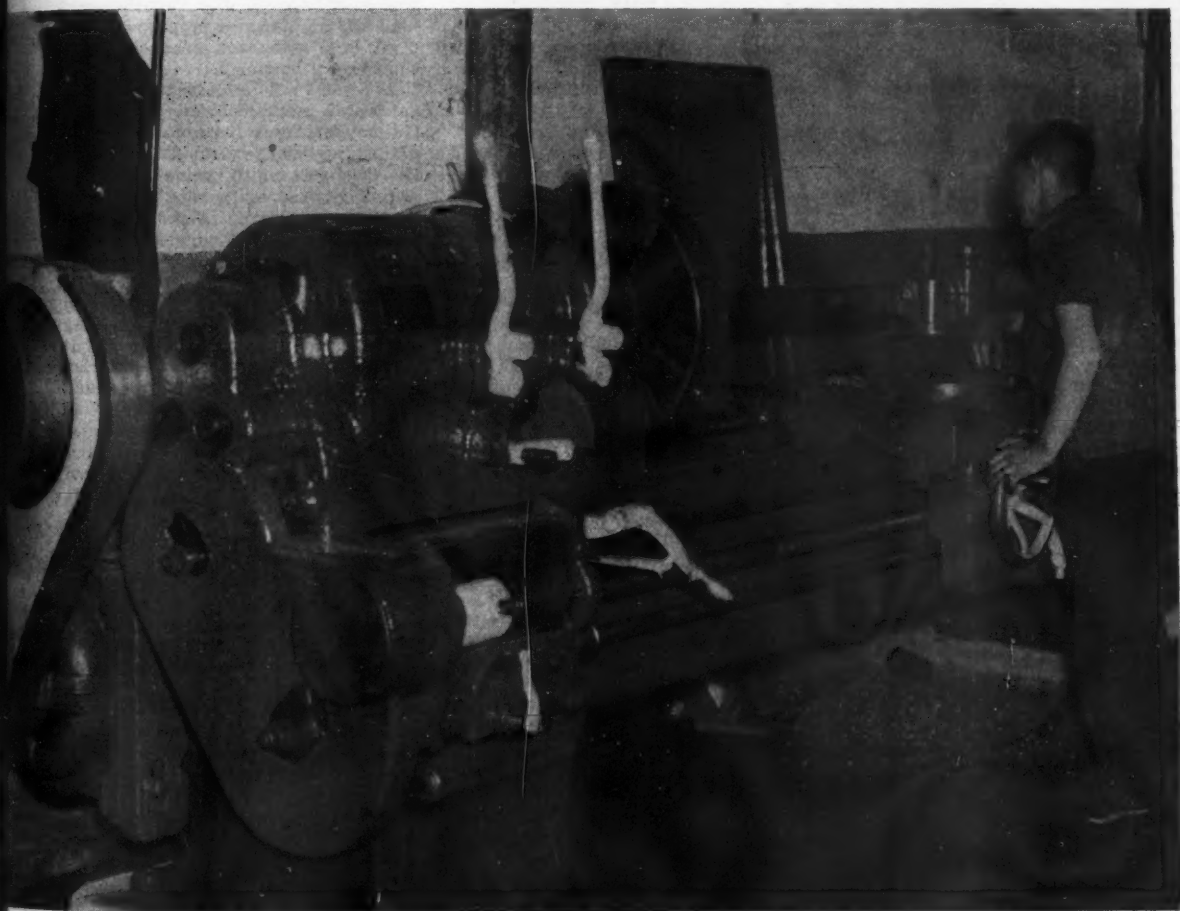
most essential to present, (4) what method will be used to select the men who will be given the training, (5) what is the maximum number of men suited for each class, (6) will there be definite material advancement for the men who complete the work—so that they will be properly encouraged and will thus desire to cooperate in the program.

The purpose of training in mechanical mining is to obtain the greatest efficiency from the equipment and the men employed, taking into consideration the factors of safety, production and cost. Training of men—whether laborers, keymen or supervisors—should not be considered or attempted as a welfare undertaking. It is a practical business venture, tempered with a liberal measure of human understanding—with increased profits as its objective. A man's present job will seem much more attractive to him if he knows that it is a "stepping stone" to his own advancement. Every supervisor should try to develop some sort of a plan for promotions covering all jobs in his own department. Then, he should make it clear to each

man just where his present job may lead him if he makes good. It must be clearly understood by the employee that promotion depends upon performance.

Training Services Now Available

The type of training that is available today is much more flexible than was found before the present war emergency. Federal Government agencies have established and made available to industry regulated Apprenticeship Training Service, Training Within Industry or On-the-job Training and (for college students) Engineering, Science and Management War Training (E. S. M. W. T.). State Vocational Services, with the support of the Federal Smith-Hughes and George-Deen acts, have given us the Mining Extension Service in cooperation with the School of Mines of our State University, and we have the Mining Trade and Vocational Schools and Leadership training. Independent services have established outlines for us covering the majority of the



Under well-planned training programs, young men may enter upon regular duties prepared to take over such tasks as lathe operation

usual training material to be used in the conference training procedure, motion and sound films, slides, charts, and bulletins.

After much study and thorough consideration of all of these agencies we selected the State Mining and Vocational School to supply our pre-employment or vestibule training. The Mining Extension Department, Training Within Industry, Foremen's Conferences, supplemented with Personnel Leadership, charts and sound films have given us the material we use for supervisory training. Apprentice training is furnished by the State Mining and Vocational School in co-operation with the company's own apprentice plan. These different agencies supply us with a well-balanced training program at a moderate cost.

Logan County Mining School

The Logan County Mining School is maintained by Federal, state and county funds. The Federal funds are provided by a special war appropriation and the Smith-Hughes—George-Deen vocational acts and are administered by the vocational educational departments in Washington and Charleston. In order to be eligible to receive these Federal funds each state and county must supplement this money with a certain percentage of additional funds specifically appropriated for this purpose by the state legislature and the county board of education.

The Logan County coal companies contacted the local school authorities and asked their support and cooperation in arranging for the establishing of a county vocational mining school. This school was to give vocational training in mining occupations to junior high school students, high school students, unemployed mining applicants and supplementary training to employed mining workmen. This trade school training should tend to sell the younger generation upon the advisability of coal mining as a desirable and profitable vocation and at the same time give the less fortunate individual who cannot attend—or has not attended school—the opportunity to study and advance in mining occupations. The theme of the vocational school is to "learn by doing" and this results in a minimum of theory being taught. The school building covers an area of 5,000 sq. ft. of floor space with rooms and equipment to instruct in the following subjects: Safety, Welding, Machine Shop, Mine Layouts, Electricity, Mining Repair and Assembly Shop, Mine Sketching and Blueprint Reading, Ventilation, Timbering, Track Work, Mine Wiring, Bug Dusting, Shot Fireman and Conveyorman.

The trade school has been in operation approximately 16 months and has a capacity of 252 students with the

present enrollment of 227 junior high and high school trainees. The school boy is required to take the entire curriculum and school credit is given for any completed subject should he elect to take the mining course as his major subject while in high school. The reason for this is that our ultimate aim is to develop a majority of our future mine supervisory personnel from this nucleus of high school students. The out of school student can elect to take any number of the subjects offered that he thinks would be helpful to him in the advancement of his future occupations. Our company sponsors tours of these trade school students to and through our properties in order to stimulate a desire in the student to continue and complete his school studies.

Training the Instructors

In order to assist the instructor in preparing his teaching material and to insure the employer that the school will prepare the future employee according to the employer's specifications we have now installed a teachers training course that has been in operation for seven months. This course is held weekly at the trade school on each Saturday morning for a four-hour period. Each interested operating company is represented and outlines its company's policy and views on any given teaching subject. These thoughts are organized and built into teaching outlines at these meetings and given to the instructor to use in presenting his material to the students. At each meeting a different topic is taken up until each instructor has sufficient material to train these students in an adequate mining course. The weakness that we have found up to the present time in our trade school course is that the instructors are practical field mining men and have not had sufficient teachers training in the subjects that they are now being required to teach. We feel that the success of the trade school depends upon the cooperation given the school by the employers and we are now trying to overcome this weakness by participating in the teachers training program.

The interest that has already been developed by the school boys in mining is a good indication of the final success of the trade school course. Many agencies are contributing valuable assistance in the training effort but in the end, workers must all receive training "on-the-job." Thus job training ultimately ends up in the plant and on the job, and the final responsibility for instruction rests with the foreman since he is responsible for the safety, quality and quantity of work produced in his section or department.

Education has untold possibilities of practical application that ought to

be worked into our school systems. Public schools in West Virginia have been conducted by principals and teachers who confessed that they were educating boys to leave the mines and not follow the dirty occupations of their fathers, instead of dignifying and improving one of the most essential and noblest of jobs: warming and furnishing civilization with food and power for industrial employment of every kind. We hope that the trade school will be one of the fruits of the up-grade program arising out of the current world catastrophe.

What is Wanted of Supervisors

The outstanding qualities required for efficient supervision in mechanical mining are: character, mining experience, natural aptitude, training, tact, ability to adapt himself to changing conditions. These qualities are recognized as being essential to good mining supervision by practically all mine operators. We also know that some men have natural supervisory ability—while others must have assistance in this development. Another well established fact is that the right kind of training, when properly applied, will give each of us a better supervisory batting average. The section foreman is an essential coordinator in a mechanical mining section. He is alert and resourceful, anticipating the delays before they happen. He considers with pride his men, equipment and his section so he can be justly considered as the vital link between men and management. There is always good section foreman material available in all the different coal mining areas, but the training of these men for these positions is a long extended and continuous program. It requires an abundance of material, time, tact and patience. One must consider both the needs of the coal industry today as well as tomorrow, and try and outline the training course so as to cover the required practices as well as the basic fundamentals of practical mining.

One of the industry's most critical handicaps today is the lack of tactful and intelligent handling of men. The human approach is also the approach that gives us the maximum output and production. With these factors in mind we attempted to find a training service that would help us in the development of our supervisors in some or all of these qualities. From our investigations we found that over 90 percent of all effective training is done on the job through competent supervisors. Our investigation also revealed that the Training Within Industry Service of the War Manpower Commission was designed to help the supervisor acquire the skills of instructing, planning and leading with the understanding that the com-

pany would furnish him with the necessary knowledge of work and responsibility. These courses seemed to be the practical answer to our problems. After careful consideration we decided to base our supervisory training program upon the three courses of the Training Within Industry Service, namely:

1. Job Instructors Training.
2. Job Methods Training.
3. Job Relations Training.

One of these courses is given each year to the entire supervisory organization by our own ten instructors who have attended a teachers training institute conducted by the Training Within Industry Service. This institute lasts six days and is held at Holden each year prior to the conducting of our classes. The training classes are then scheduled for 12 men covering five 2-hour sessions. The instructors are rotated until we have covered our entire supervisory organization, which consists of approximately 400 people. When each instructor has completed the three separate institutes and has taught several classes in each subject he is removed from the instructors group to allow a new man to be trained in instructing and leadership qualities.

Job Instructors Training

Job instructors training is a plan that is especially prepared to help all those who instruct workers on the job. When new or old employees are put on work unlike anything they have ever done before, the foreman on the job (the men who know the work) have to see that these employees are broken in quickly on the right way to do the job. This covers the following factors in a clear logical sequence:

1. Prepare the worker.
2. Present the operation.
3. Try out the performance.
4. Follow up.

The plan or pattern is found useful to all who direct the work of others—from foreman to general manager.

Job Methods Training

Job methods training is a course which is designed to help the foreman simplify and improve the present method of doing a job. It is a practical form of training for foremen which improves production through better utilization of men, materials and machines. In any type of operation there are always distinct opportunities for improvement in the ways in which the work is done. The key to these improvements most often is in the mind and skill of the foreman, for he is closest to the job. Each participant, while taking the training spends most of his time in actually making job improvements by applying the four following steps:



High School credit is given to the boys who elect the mining course as their major subject



Trade school training should tend to sell the younger generation on the desirability of mining as a profitable vocation

1. Break down the job.
2. Question every detail.
3. Develop the new method.
4. Apply the new method.

Job Relations Training

Job relations training is a practical plan to help foremen develop skill in getting results through the people they supervise and gives them training in techniques of working with people in a way that gains cooperation, enthusiasm and promotes teamwork. There are certain basic principles which are emphasized as necessary in establishing and maintaining good relations between the foreman and the worker. The principles are as follows:

1. Let each worker know how he is getting along.
2. Give credit when due.

3. Tell people in advance of the changes that will affect them.
4. Make the best use of each man's ability.

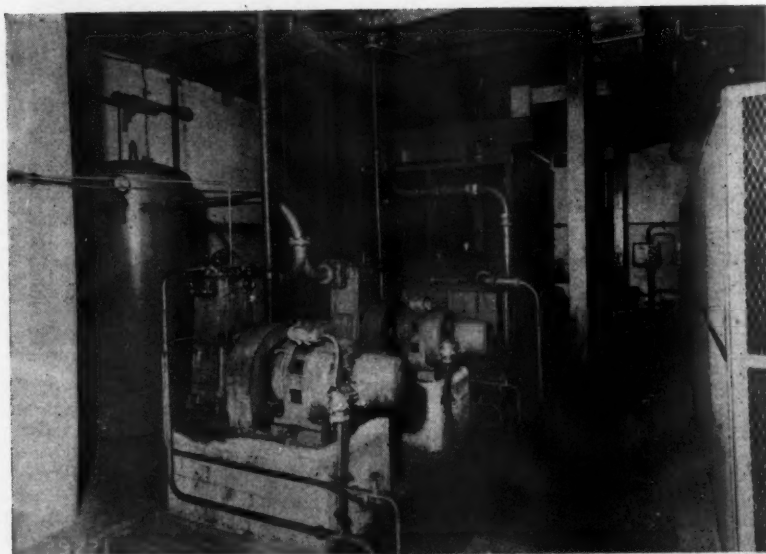
The job relations training has shown promise of supplying one of our greatest needs in our mine supervisory development program, namely: *the correct handling of workmen.*

Monthly Foremen's Meeting

Once each month a foremen's meeting is held at each mine and this meeting affords the opportunity to discuss all types of personnel and training problems with our first line supervisors, and tends to keep our basic training program alive and active at all times. At each meeting we use sound slide films covering such topics

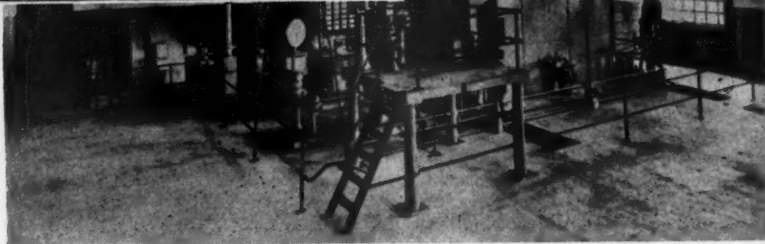
(Continued on page 53)

The Michael Colliery Hoist



Copper strip connections in rotor circuit are encased as shown. Air compressor equipment in foreground

Interior view of winder house and geared A.C. hoist



By T. H. PETCH

M.A.
A.M.I.E.E.

IT is often found that a winder equipment with induction motor drive is more economical to operate than one with Ward-Leonard drive. The electrical equipment for an a.c. winder, moreover, is only about one-third or one-half of the cost of corresponding Ward-Leonard equipment, so that where the greater nicety of control of the latter is not of paramount importance there is often much advantage in adopting a.c. drive. Many sources of power supply are now large enough not to be affected seriously by the peak loads which occur even with the largest winders. Thus, since the introduction of 6,600-volt reversing contactors, enabling equipments to be operated direct from a 6,600-volt supply, a.c. winders of continuous ratings up to 3,000 hp. and more can now be considered.

The following is a description of a recent 1,950 hp. 6,600-volt equipment installed at the Michael Colliery of the Wemyss Coal Co. Ltd., Scotland. The mechanical portion of the winder was manufactured by Messrs. Fullerton, Hodgart & Barclay Ltd., who

were the main contractors. The electrical equipment was supplied by The British Thomson-Houston Co. Ltd.

General

The leading particulars applying to the initial duty are as follows:

Depth of shaft	562 metres
Weight of one empty cage, chain and hooks.	7200 kg.
Weight of one empty tub	340 kg.
Number of tubs per cage	6
Weight of coal per wind	5160 kg.
Weight of rubbish per wind	7000 kg.
Weight of 50 men per wind	3820 kg.

Rope diameter	48 mm.
Weight, per metre, of rope	11.8 kg.
Running time per wind	60 secs.
Maximum winding speed, per second	12.5 metres

The equipment is also suitable for winding (later) the same suspended loads from a depth of 945 metres at the same speed with a running time per wind of 91 seconds and with the rope diameter increased to 54 mm.

The drum is of the single cylindrical type having a diameter of 5.5 metres and a width of 4.9 metres. It is grooved, has loose reels for the

spare rope, and is fitted with ventilated brake treads. It is covered by a mild steel casing which makes a neat job and keeps the engine house clean.

The motor runs at 410 r.p.m. and drives the drum at 43.5 r.p.m. through a flexible coupling and a single reduction gear. The latter is contained in an oil bath gear case.

Two brakes are fitted, one at each side of the drum. They are of the type having curved shoes centrally pivoted on swinging posts. Each is applied by weights and the weights are raised by pressure air brake engines. They are fitted with automatic adjustment. The brake control is of the Iverson type, which gives a brake pressure proportional to the brake lever position. The two brakes come into operation in se-

quence in cases of emergency, the second one acting as a safety brake to take care of the possible failure of the first. The brakes are tripped in emergencies by the interruption of the power supply to two electro-hydraulic thrusters.

Stator Reversing Contactors

The motor stator circuit is controlled by triple-pole contactors for forward and reverse operation arranged to give three breaks in series, per phase. They are mounted on a channel and angle iron framework. The forward and reverse contactors are electrically and mechanically interlocked to prevent any possibility of both sets being closed at the same time. Those for one direction of rotation are mounted all on one side of the framework, while those for the opposite direction are mounted on the opposite side. Operation of the contactors is by means of d.c. magnets

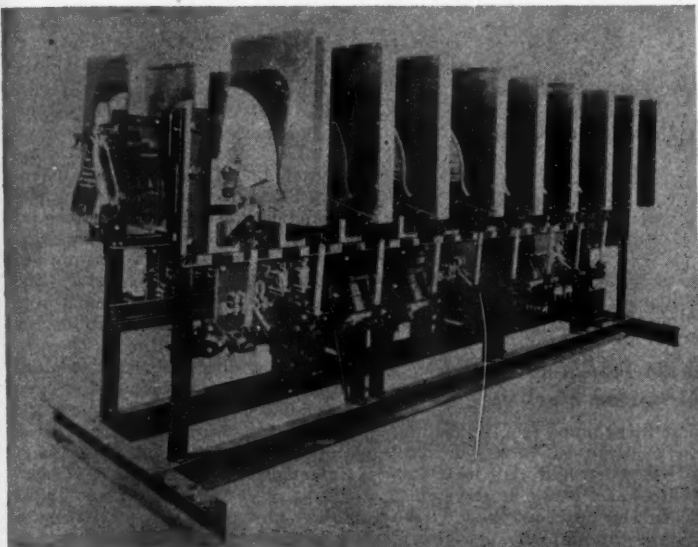
tactor set (for example that for forward operation) prevents the other set from being closed until the arc is cleared.

Arc chutes are provided on each contactor pole, these being arranged so that the arcs from the poles in the two outer phases are blown outwards and those from the poles in the middle phases are blown upwards. This prevents the possibility of an arc passing from a contactor in the middle phases to a contactor in either of the outer phases, or from any contactor to the frame.

Other Electrical Equipment

The 6,600-volt switchgear is of the withdrawable truck type. It includes the main oil circuit breaker, also high rupturing capacity fuses and an isolating switch for the auxiliary transformer. Speed control of the winder is provided by the liquid rotor controller of 900 hp. continuous dis-

Triple-pole, 6,600-volt, reversing contactors for stator circuit of hoist motor



The geared A.C. hoist is driven by a B.T.H. 6,600-volt, 3-phase, 50-cycle, 1,950-h.p. (3,900 h.p. peak) slip-ring induction motor

Protection against overspeed and overtravel is provided; also a dial-type depth indicator. A tachograph and two air compressors, one being a standby, are included in the equipment.

Motor

The winder is driven by a 1,950 hp. (3,900 hp. peak), 14-pole, slip-ring induction motor, operating on a 6,600 volt, 50 cycles per second, 3-phase

and the direct current is obtained from a rectifier unit mounted on the framework. Direct current operation is an advantage over a.c. operation in that the closing of the contactors is less violent and there is less resultant wear.

In addition to the electrical and mechanical interlocks previously mentioned, voltage interlocking is also provided. By means of this the arc resulting from opening the one con-

sipating capacity. It is operated by an automatic accelerating device, which is governed by the driver's control lever. The auxiliary transformer is rated 25 kva. and provides a low tension supply for the auxiliaries, which is taken through a distribution board.

The usual limit switches, safety devices, driver's instruments, gauges, and indicating lamps complete the equipment.

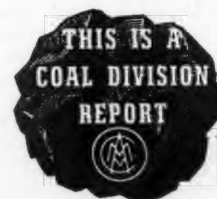


Underground Formation and Suppression of Coal Dust

A Report of the Committee on Coal Dust Abatement

By D. H. DAVIS

Chairman



Part II—Methods and Costs of Underground Water Distribution to Working Faces with Pipe Lines and Mobile Tanks

WATER distribution represents the bulk of expense in the operation of spray systems and hence must be given careful consideration. The number of dust sources that are to be controlled and the degree of dust reduction required must first be recognized. If all operations in the production cycle are to be sprayed, water distribution by pipe is probably the most practical. If only one or a few of the operations are to be sprayed, then other methods are applicable. Some of the various plans used for supply water at the face are:

1. Use of pipe throughout the mine to the working face with water supply from a central source.
2. Use of pipe to the faces in working sections with water supply from a conveniently located dam or sump. These dams or sumps may be applied by:
 - A. Track-mounted tank car.
 - B. Drill hole tapping surface stream.
 - C. Connection to mine drainage system.
3. Use of track-mounted tank car holding 1,000 gal. or more which may be switched off the main track in the working section and the water distributed under pressure to the face by pipes.
4. The use of track-mounted tank car with pump that is hauled with the cutting machine or loading machine.
5. Use of the tank built as an integral part of the cutting machine truck.

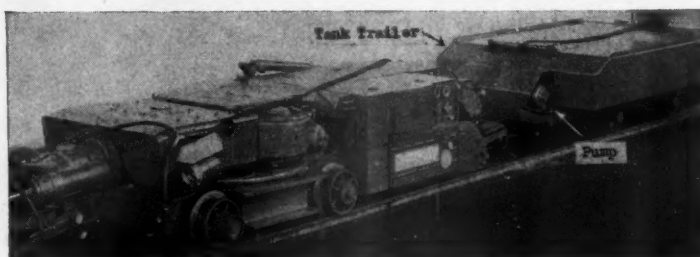
6. Use of small hand portable tanks holding from 5 to 6 gal. of water, charged into the tank under air pressure.

Mobile Tanks and Tank Mounted Machines

The first three plans require the installation of pipe to each working face, but with three different methods of supplying water to the pipe system. While no survey has been made it is probable that the majority of under-

than to install and operate pipe lines.

Three makes of track mounted cutting machines have been equipped with either integral tanks or trailing tank cars, and it has been found that the trailing tank car is of no particular handicap to the maneuvering of the cutter. The shortwall mining machine truck has also been equipped with a tank of approximately 200 gal. capacity with the turntable and tilting frame mounted directly on top of the tank. In other respects, the machines are no different from standard equipment of the same make and no appreciable change is made in the length of the tilting frame or in the overall height of the unit. The tank is internally braced and reinforced with the necessary stiffening plates and has protective plates to form a substantial bumper. The accompany-

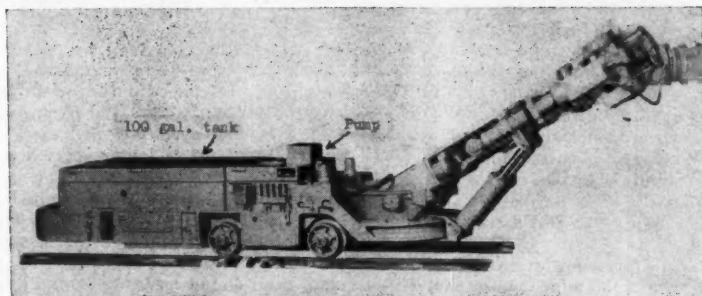


Tank trailer with track-mounted cutter

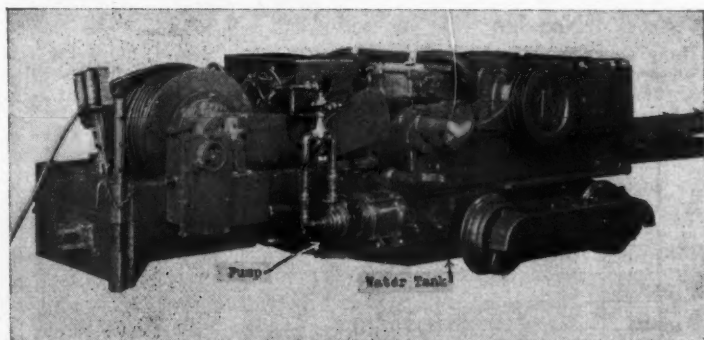
ground systems for sprinkling at the working face employ one of these three methods. The use of the trailing tank car is confined to mines with track in the working places, but there is no reason why an integral tank with a tractor mounted cutting machine would not also be practicable. Such methods eliminate pipe lines in working places, and as shown later in this report, costs considerably less

ing illustrations show the three types of integral tanks: (1) trailer, (2) mounted on track cutter and (3) mounted on shortwall truck.

In the use of water tanks integral with the cutting machine, it is necessary to work out an adequate system for their water supply. The tanks hold sufficient water for 7 to 12 cuts, depending on the amount of water required per cut and a good method of



Tank mounted on universal cutter



Tank mounted on shortwall truck

supply appears to be by means of a large track mounted water tank of 1,000 gal. or more capacity, fitted with a pump of 50 gal. per minute capacity. Little time is lost in filling the cutting machine tank trucks from this type of tank.

There are systems of mining such as with conveyors, where there is no track to the face and the cutting machine truck cannot be used. To meet this condition without installing a pipe line, a coal company devised hand portable tanks of 5 to 6 gal. capacity, made of a 5½ ft. length of a light-weight boiler tubing with tightly welded end plates and fitted with a substantial valve. These tanks are filled with water under pressure and are capable of maintaining the charge for a week or more. They are fitted with handles and are usually dragged from the entry to the face; the total weight of a filled tank is approximately 100 lb.

These tanks may be used in connection with any of the face operations and are inexpensive and easy to build. To operate, the rubber hose leading to the cutting machine spray system is coupled to the portable tank, the valve on the tank is opened and the air pressure previously charged into the tank, forces the water through the spray system. A valve on the cutting machine provides the operator with control while cutting. A strong concentration of wetting agent is added and approximately 50

percent less water is used with the hand portable tanks as compared to the shortwall cutting machine tanks.

Cost of Water Distribution

A series of tests was made by a coal company in one of its mines to determine the cost per ton of spraying during the coal cutting operation. These tests covered two methods of getting water to the machine at the face; (A) by pipe lines from an underground dam that was filled by a

water car, and (B) by a track mounted tank serviced by a water car. The cost figures are taken from actual construction and operation and are based on mining a butt entry section yielding 72,000 tons of coal per year; the costs also include depreciation factors of 20 percent per year for all spraying, pumping and distribution equipment and 40 percent per year for 1¼-in. pipe lines. On the above basis the cost of spraying the undercut by each system is as follows and a detailed estimate is given in the tabulation below:

A—1.75 cents per ton for spraying when using the pipe line in conjunction with a dam and water car.

B—0.75 cents per ton for spraying the undercut when using a cutting machine tank truck serviced by a water car.

Pumps for Piping Systems

Experience has indicated that the points of spraying, pump pressure, and type of nozzle are of primary importance in the attainment of adequate dust suppression during cutting. Previously in this report the location of sprays for cutting machines has been described but it is believed that the subject of pumps, nozzles and filters is of sufficient importance to warrant discussion.

For dust suppression in any single operation of mining coal, it is generally desired to deliver a gallonage of from about 1 to 5 g.p.m. at a pressure over 60 p.s.i. and preferably 75 p.s.i. or higher at the nozzles. One continuous pipe system for a large number of working place, let's say an entire mine or an entire division of one mine, will require a pump which must be capable of delivering a higher gallonage than the total number of

COST OF LABOR AND MATERIAL IN CENTS PER TON COAL INSTALLING AND OPERATING WATER DISTRIBUTION SYSTEMS

Item	A	B
	Pipe Line (cents per ton)	Tank Truck (cents per ton)
Building dam	0.06	...
2-in. pipe line	0.09	...
Pump assembly	0.08	...
1¼-in. pipe line	0.21	...
Hauling water to dam	0.08	...
Labor for repairing line	0.56	...
Labor for advancing and retreating line	0.17	...
Treating water with wetting agent	0.17	0.17
Water car	0.05	0.05
Spray assembly	0.01	0.01
Repairs to water car	0.03	0.03
Labor installing 2-in. line	0.10	...
Labor installing 1¼-in. line	0.06	...
Repair material for pipe line	0.08	...
Tank car	0.35
Hauling water to tank truck	0.05
Repairs to tank truck	0.06
Total	1.75	0.75

discharge points. It must also maintain sufficient head to overcome the frictional drop in the pipe line and deliver the required pressure at the most distant discharge point. Many mines depend entirely on water supply from the surface with static head from the depth of the drill hole and no pumps are needed on the distributing system.

For such a piping system a centrifugal pump is usually selected, although a plunger pump will serve the purpose. With centrifugal pumps operating at a constant speed, the head varies as the square of the impeller diameter; also as the square of the impeller speed. When running at 1,750 r.p.m. the impeller of a centrifugal pump must have a diameter of not less than 16 in. to deliver a sufficiently high pressure for spray systems (not less than 60 p.s.i. at the nozzles) and at 3,500 r.p.m. the impeller must be at least 8 in. diameter. Most direct current motors in mining machinery operate at 1,750 r.p.m. and the size of a centrifugal pump when used to deliver a small capacity of water at high pressure is excessively large; multiple stage pumps may be used to give the correct pressure without requiring a large diameter pump. However, centrifugals are generally applied to a piping system for a mining panel or several panels where a number of discharge points are in use.

Pumps Mounted on Machines

In the last few years there has been a trend away from hose sprinkling and an increase in the practice of mounting integral spraying systems on trailer tank cars and on individual cutting machines, both the shortwall and universal types. Such an installation requires a low capacity pump of 1 to 5 g.p.m. at 150 ft. head and as explained above, a centrifugal pump to give the required pressure is usually too large for the space available on the machine. Positive displacement pumps such as piston or plunger type operate at slow speeds, so that considerable space is required to mount a motor with reduction gears or V-belt. Turbine pumps have been used nearly exclusively for spraying systems integral with cutting machines as they may be direct connected to a motor, require little overall space, and are capable of delivering a small gallonage at high pressure. Figure 4 shows the relationship between pump pressure in p.s.i. and g.p.m. delivered from two $\frac{3}{32}$ -in. diameter orifices.

Turbine pumps depend on close clearances (.002 to .003-in.) between the impeller and the casing in order to develop the required pressure and precautions should be taken to prevent undue wear on the impeller and liners. Manufacturers ratings for

capacities and pressures are based on clear water as acid, dirt, or scale will cause excessive corrosion and erosion on the parts forming the close clearances and with only a slight wear there will often be a large drop in pressure. Neutral and clear water is often very difficult to obtain. When mine water is the source of supply and even if clear neutral water is introduced into the distribution system, there is always a certain amount of scale formed which cannot be prevented. Acid mine water should not be used unless it is neutralized by lime as pipe lines and pump parts will be corroded in a short time.

Nozzles

Many experiments have been made to determine the form or shape of spray patterns that will give best

Filters

Dirt, scale, etc., may be prevented from entering and damaging the pump by the use of an adequate filter on the suction side of the pump; thus wear is decreased and pressures are maintained for a longer period with less pump maintenance. The filter found to be especially well suited for this use is a disc type with an automatic cleaning having a disc spacing of 0.005 to .015 in. A spacing of .008 has been found suitable for most applications. The filters operate with a pressure drop of approximately 5 p.s.i. They are readily and quickly cleaned by one complete turn of a handle which causes the filter cartridge to revolve; cleaning blades which extend through the openings between discs comb out all collected

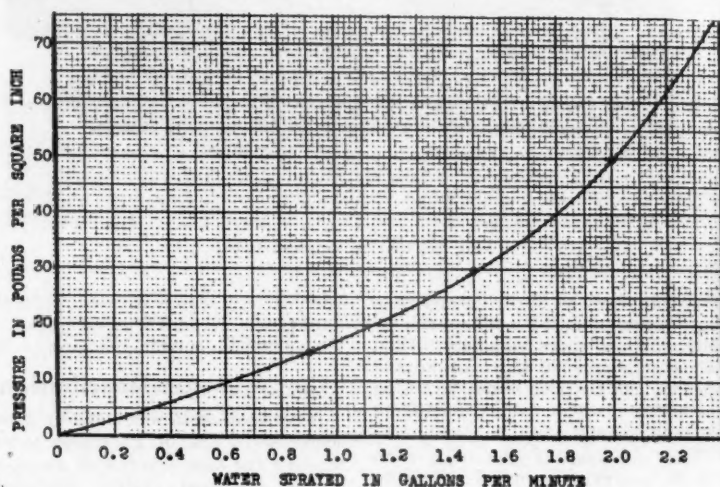
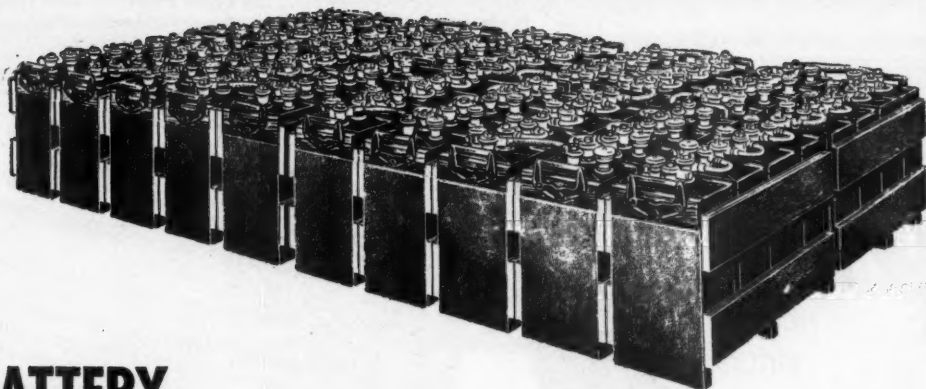


Fig. 4. Graph showing the relation between pressure in P.S.I. and water in G.P.M. for cutting machine sprays using two $\frac{3}{32}$ " orifice nozzles; one as a jet, the other as a spray

results in dust suppression and this has resulted in the adoption of several sizes and types of nozzles. Figure 2 showed several manufactured types producing various spray patterns which have had successful applications. Attention is called particularly to a new type of full cone spray pattern used on the ingoing side of the cutting chain. At the nozzle the angle of the spray pattern is approximately 18 degrees and at the end of the cutter bar a spray pattern of approximately 24 in. diameter is produced. It has been found that this type of spray located on the ingoing side of the cutting chain effectively reduces dust produced during sumping. The final selection of the nozzles best suited for any particular mine or seam, is a matter of trial, and depends mostly on the location of the nozzle in respect to the dust to be suppressed as well as on other factors discussed earlier in this report.

foreign solids and drop them to an ample sump below where they remain until it is convenient to remove them.

Another kind of filter is the Y-type strainer with 20 or 30 mesh wire cloth as the strainer; this is frequently used just in front of the nozzle to remove dirt, scale, coal, etc., so that the nozzles will not become clogged. In order to prevent solids from getting into the water tanks through the feed pipe, a submerged well with $\frac{1}{16}$ -in. diameter perforations has been designed to insert into the feed pipe. In designing a spray installation for cutting machines, where the tank is integral with or a part of the machine, it is usually beneficial to have a foot valve on the suction line to aid in keeping the pump primed. All spray equipment requires careful continual inspection to maintain the system in first class operating condition.



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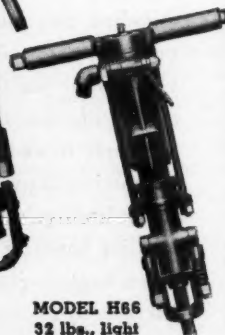
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WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

SENATE ratification of the "San Francisco Charter" is anticipated by mid-August, according to plans announced by Senate Foreign Relations Committee Chairman Tom Connally on his arrival at the Capitol from the West Coast. Senator Connally expressed the hope that his committee can begin hearings during the first week in July and that after two weeks of hearings the Charter can be ratified by the Senate in from two to four weeks. Meanwhile it is the general feeling that after the second week in July the House will carry on a series of three-day recesses until the Senate completes its work and that all but a few of the House members will return to their homes for the greater part of the summer.

Congress Extends Trade Agreements

The widespread and effective pressure exerted to put through the Administration program as carried in the Doughton bill, to extend the authority to negotiate reciprocal foreign trade agreements for three years and to permit reductions of 50 percent in the rates of duty existing on January 1, 1945, resulted in Senate approval of the measure June 20 in the form in which passed by the House; thus the bill is ready for early approval by the President. In reporting the bill to the Senate floor the Finance Committee, by a close vote, struck out the section authorizing the additional 50 percent cut in duty, but this committee amendment was rejected by the Senate, 47 to 33. While the "Bailey Amendment," which would have prevented reductions in duty on strategic and critical minerals and metals, was not adopted by the Finance Committee it is credited with playing a part in the Committee's elimination of the 50 percent clause.

Tax Adjustment Act

On June 18 Ways and Means Committee Chairman Doughton intro-

duced the "Tax Adjustment Act of 1945" which carries the five-point tax program developed by the Joint Committee on Internal Revenue Taxation and the Treasury. The bill would (1) increase the excess profits tax specific exemption from \$10,000 to \$25,000, effective with the beginning of the tax year 1946; (2) provide that the post-war credits of 10 percent of the excess profits tax be taken currently with respect to tax liabilities of 1944 and subsequent years; (3) advance to January 1, 1946, the maturity date of outstanding post-war refund bonds; (4) provide for speed-up of refunds resulting from the carry-back of net operating losses and of unused excess-profits credits; and (5) provide for speed-up of refunds resulting from the recomputation of deductions for amortization of emergency facilities.

This measure is designed to strengthen the cash position of business enterprises during the reconversion period. Committee member A. Willis Robertson of Virginia is pressing for inclusion in the bill of a repeal of the excess profits tax to become effective at the end of the calendar year following the termination of the Japanese war; Robertson is also contending that the increase in the specific exemption shall be made effective January 1, 1945, rather than January 1, 1946.

Intangible Drilling Costs

The Senate and House have both approved House Concurrent Resolution 50, approving retroactively the Treasury Department's existing regulations which give the taxpayer an option either to capitalize or to deduct as expense the "intangible drilling and development costs" of oil and gas wells. Purpose of the resolution is to offset the decision of the Fifth Court of Appeals in the FHE Oil Company case. The report of both the Ways and Means and Finance Committees contains the statement that the purpose of the resolution is

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Washington Highlights

CONGRESS: Recess hangs on San Francisco Charter ratification.

TRADE AGREEMENTS: Administration prevails on Doughton bill.

TAXES: "Tax Adjustment Act of 1945" to be speeded.

RENEGOTIATION: Extended to December 31, 1945.

PREMIUM PRICES: Non-cancellable provision enacted.

GOLD RESERVE: Cut from 40 percent to 25 percent is now law.

BRETTON WOODS: Senator Elmer Thomas urging recognition for silver.

L-208: Order to be lifted July 1.

WAGE SUITS: Gwynne bill to limit claims active in House.

COAL PRICES: Western Pennsylvania producers pressing OPA for increase.

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"to remove any doubt as to the validity of Treasury Regulations giving to the taxpayer the option to either capitalize or charge to expense intangible drilling and development costs in the case of oil and gas wells." As a protection to mining taxpayers both reports also contain the statement that "The consideration and adoption of this resolution should not be construed as creating any implication adverse to mines respecting their development costs."

Contract Renegotiation

On its way to the White House after approval by House and Senate is the bill continuing the renegotiation of war contracts by the War and Navy Departments and the Maritime Commission to December 31, 1945. It is provided in the bill that the repricing of war contracts is also to end December 31, 1945, unless further authority is granted in the meantime. In the previous contract renegotiation extension the President was authorized to extend renegotiations for an additional six months after the December 31 termination date, but this power is not contained in the present bill.

Premium Price Plan

The Hayden-McFarland bill, S. 502, was approved by the President June 23. This is the measure which continues the Premium Price Plan on copper, lead and zinc to June 30, 1946. The controversy caused by the action of the House Committee on Banking and Currency in striking out the language of the bill which made all classes of premium payments non-cancelable was settled by the action of the conferees. The Senate conferees, led by Senator Abe Murdock of Utah who hurried back to Washington from the West to participate in the conference, stood firmly for the Senate version and thus saved the non-cancelable feature which had been vigorously attacked by OPA and WPB officials.

As the President signed S. 502 he stated that he had done so "because the continuance of these subsidy payments is essential to assure necessary war output and to provide support for the stabilization program." He further said "I interpret it as the desire of Congress that these subsidies shall be paid only as long as, and to the extent necessary to secure needed war production under existing price ceilings. As opportunity permits, therefore, subsidy programs will be reduced or discontinued as rapidly as feasible within the limits of the present law. Due consideration will be given, of course, to the legitimate needs of producers and to the desirability of maintaining balance in our national and international procurement programs. Administrative action to curtail copper, lead and zinc subsidies under the premium price plan would be prevented, however, during the fiscal year 1946 by the provision which makes all classes of such premiums non-cancelable during that year. If it becomes clear that continuance of these payments at present levels is no longer necessary for war purposes, I shall request enactment of supplemental legislation which would permit a reduction of such unnecessary subsidies. We must make sure that subsidies contribute to the essential purposes for which Congress authorized them."

Gold Reserve—Bretton Woods

The Gold Reserve Bill is now a law following its approval by the President June 12. Constituting one of a series of measures dealing with domestic and international financing and trade, the Act reduces to 25 percent the gold reserve required to be held against Federal Reserve Bank notes and deposits.

Following House passage on June 7, the Bretton Woods World Bank and Monetary Stabilization Fund bill has been the subject of extended hearings in the Senate Committee on Banking

and Currency. It is anticipated that when the bill is reported to the Senate floor its form will follow closely with that of the House bill discussed in last month's issue.

Meanwhile Senator Elmer Thomas of Oklahoma has advanced two amendments which would (1) create a unit of value to be known as the "gold ounce" which would be used merely as a means of describing United States' contributions to the Fund and the Bank; and (2) permit the use of United States silver "at a fair market price" in the currency advanced by this country to the Bank. From the beginning Senator Thomas has consistently fought for the recognition of silver in the operation of the Bretton Woods proposals.

Gold Mining—L-208

Approximately two and one-half years after its promulgation on October 8, 1942, the WPB gold mine closing order, L-208, has been rescinded effective July 1. Serious handicaps still make difficult the resumption of gold production. Manpower problems remain to be worked out with regional officials of the War Manpower Commission. Likewise the question of wages to be paid is a matter to be taken up with the regional officials of the War Labor Board. The Mining Division of WPB has stated that gold mines will be classified as "non-serialized mines" under order P-56 and will have a preference rating of AA-5 for maintenance, repair and operating supplies. For machinery and equipment (exceeding \$500 in cost) priorities assistance is to be applied for on WPB-1319 and forwarded direct to the Mining Division in Washington.

Limit Wage Claims

Hearings are proceeding before a House Judiciary subcommittee, under the chairmanship of Representative Hobbs of Alabama, on the bill by Representative Gwynne of Iowa which would provide a limitation of

two years for public suits and one year for private suits under Federal laws, including the Fair Labor Standards Act of 1938 and other statutes. Representatives of the American Mining Congress and of a number of other natural resource organizations have appeared before the subcommittee, urging enactment of the Gwynne bill and citing numerous instances of the serious hardships worked upon productive enterprises by the threat of employee suits for back-pay, "damages" and attorney fees under the provisions of the Wage-Hour Act.

The Subcommittee was told of the case of a large mine where the company's dependence on the interpretation of the law given by the Wage-Hour Administrator resulted in the payment of a very costly claim. In the course of the testimony stress was laid on the plight of the coal industry under recent court decisions involving potential liabilities in connection with retroactive claims for underground travel time.

Coal Prices—OPA

The situation of coal producers under the OPA pricing policies, which have been applied following the recent wage increases, have found expression during the past month in protests lodged by Western Pennsylvania coal operators, UMWA officials and Congressmen. Vigorously presenting a situation which is causing concern in many coal fields of the country, the Western Pennsylvania operators have held three meetings with OPA officials, culminating in a promise on the part of Deputy Administrator Brownlee to place before Director Davis of the Office of Economic Stabilization the request of the operators for an additional 10 cents per ton in price over and above the 15-cent increase approved by OPA following the recent wage boost. Brownlee stated that he will also discuss with Director Davis the matter of altering the "Vinson formula" under which the recent coal prices were set.



Ross Shaft, Homestake Mining Co.

Training

(Continued from page 43)

AS SAFETY, PRODUCTION, HUMAN RELATIONSHIP, ABSENTEEISM, TRAINING AND HEALTH. We supplement these films and reports with up-to-date charts showing our trends and progress in SAFETY, PRODUCTION, ABSENTEEISM, LABOR SUPPLY and EFFICIENCY. Management Information and Personnel Leadership bulletins are placed in the hands of supervisors weekly. We discuss this material at each meeting and the foreman keeps these bulletins as a reference library in his home. Our meetings with each supervisory group requires an hour before or after the work shift once each month, and covers our entire mine official organization.

The apprentice training is made available to our prospective supervisory employees—especially our trade school and college graduates—by employing them in the different departments of production, supply, preparation, cost control and engineering until we are assured that they are adequately prepared for a supervisory position. The length of time of training in each department depends upon the individual and his own background of training.

A personal training record is carried upon each individual student, regardless of the type of training he is taking, and is cross-indexed and filed in each employee's personnel folder so that he will always get just consideration for the training that he has taken. This tends to create an incentive for the individual to continue to study and take training as he progresses with his work. Each individual in a supervisory capacity should feel that if he makes an honest effort and is congenial and obedient to his superiors he is secure in his position, and is always in line for promotions in accordance with his individual merits as opportunities may arise. Each year a flow sheet is developed covering employment and training which charts the progress that has been made during the past year with respect to former years. This flow sheet instantly spots employment and training needs as a guide in the planning of future programs.

Sound Human Relationship the Goal

We believe that sound human relationship can be established if the worker understands the fundamentals, the problems and the possibilities of free industry. If he feels secure in his position in the industry in which he is employed, if he is treated fairly, and if he is given every oppor-

tunity to exercise his initiative and ingenuity, and to advance in proportion to merit, the basic causes of mining industrial unrest insofar as they are under our control will be eliminated.

Some people believe that organized company training programs are a very good thing; others believe that it is useless and unnecessary and both have reasons for their belief. Without attempting to go into the arguments that have been and are being advanced in this controversy we can state one definite fact: There has never been a new development in American industry accepted by the majority of different types of management unless there was a sound basic reason for its existence. The progress and advancement made by modernized mining during the past 15 years have proven its principles fundamentally correct, so today it would seem logical to accept the fact that training has a future in coal mining and will continue to follow the course already well under way. We should adapt our viewpoint accordingly.

A large percentage of the training of employees consists in dealing with and developing of intangibles and it would be extremely difficult to place a definite concrete value upon any particular phase of our training program. But we do know that each trainee is showing a great deal of enthusiasm in participating in this program; conditions are improving; the company is receiving definite returns on its investment in this entire program and we plan to carry on and improve our system as rapidly as experience demands.

A Really Quiet Spot

IN the middle of the noisy U. S. Navy Yard, Brooklyn, N. Y., there is a room so completely soundproof that it approaches the quiet of the stratosphere. Here Navy engineers test sensitive radio and electronic equipment used on American naval vessels. The room is mounted on 14 short columns of rubber developed and installed by U. S. Rubber Company.

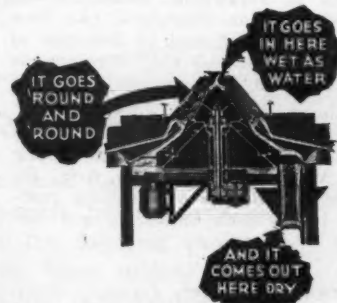
The room is 18 ft. x 30 ft., weighs eight tons, is lined with acoustical material and is airtight. Walls are non-parallel because sound reflection is less pronounced in an asymmetrical room.

Built around the outside of the chamber is a second room with brick walls 12 in. thick and a concrete floor six inches in thickness.

People are excluded during tests as breathing and movements disturb the stillness. The sound is picked up by the telephone or microphone and carried outside to devices which tell the engineers the reproductive qualities of the instrument.



FOR the most economical and simple method for dewatering and drying the smaller coal sizes. The many installations in modern coal washing plants are proof of this. We shall be glad to give you the details of the installations.



Sludge and slurry coals are also being reclaimed by using this machine. Where a large part of the ash is in the finest sizes, ash content as well as the water content is reduced.

Centrifugal and



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Personals

John C. Kinnear, who has been general manager of the Nevada Mines Division, Kennecott Copper Corp., at McGill, Nevada, since 1928, has been



appointed vice president in charge of operations in Arizona, Nevada and New Mexico. His headquarters will be in New York City.

Ira B. Joralemon, consulting engineer of San Francisco, has been elected to the board of directors of Homestake Mining Co. He succeeds the late Harold Kingsmill.

W. R. Robertson has resigned as general manager of National Mining and Milling Co., Sunflower, Ariz. He plans to establish a consulting practice in northern California and Nevada.

Erwin Gammeter, formerly chief engineer for the Bell and Zoller Coal and Mining Co., is now associated with the Paul Weir Co., Chicago.

Lionel E. Booth of Booth Engineers, Salt Lake City, is on special duty in Chungking, China, for the Foreign Economic Administration. His duties will be in connection with development and production of metals.

Alex Grant, general manager of the Boulder Valley Coal Co. in Colorado, has been made general superintendent of the Buckeye Coal Co., Nemacolin, Pa.

A. S. Knoizen, director of WPB's Mining Division, has announced that

L. M. Case, chief since September 1, 1943, of the Mining Machinery Section of the Mining Division, has resigned to assume new duties representing the Kennedy Van Saun Manufacturing and Engineering Corporation in the western part of the United States. Dr. F. Stuart Miller, assistant director of the Mining Division, will take over the administration and supervision of the Mining Machinery Section.

Esler R. Bechtel, Sr., chief chemist of the Hibbing district of the Oliver Iron Mining Co., has been made supervisor of ore movements at Duluth, according to announcement by LeRoy Salsich, president of the company.

Charles Dorrance, president of the Ohio River Company, has announced the election on May 16 of M. Creditor as vice president in charge of operations. He succeeds W. W. Marting, deceased.

C. A. Weekley, general mill and smelter superintendent for Marsman and Company, Inc., Manila, P. I., and his wife have been released from Santo Tomas prison, according to word received by relatives in Seattle.

Arthur B. Stewart, of the Davis Coal and Coke Company, recently tendered his resignation as president of the Georges Creek and Upper Potomac Coal Association. Andrew B. Crichton, of the Johnstown Coal and Coke Company, was elected president of the Association to fill the vacancy created by the resignation of Mr. Stewart.

Dr. Laurence McKinley Gould, professor of geology and geography at Carleton College, Northfield, Minn., for the past 13 years, will be the new president of Carleton, it is announced by Louis S. Headley, of St. Paul, secretary of the board of trustees.

Nationally known as a scientist, arctic explorer, author, lecturer, and teacher, Dr. Gould has had wide experience in important administrative capacities. He was second in com-

mand and chief scientist with the first Byrd expedition to the Antarctic. More recently he served as chief of the Arctic Section of the Arctic, Desert, and Tropic Information Center of the Army Air Forces with headquarters in Minneapolis and New York City. He is now serving as acting director of the Arctic Institute of North America.

Effective June 15 B. H. Schull, vice president in charge of operations, Binkley Coal Company and Pyramid Coal Corporation, has been relieved of active duty because of condition of health. He will continue in an advisory capacity.

Mr. Schull has been engaged in the coal mining business, both underground and strip, in Indiana and Illinois for 40 years. At present he is a member of the Illinois Mining Board and a member of the Indiana Coal Operators Association, both of which positions he will continue to fill.

Bituminous Coal Research, Inc., has announced the appointment of T. A. Day, of Huntington, W. Va., as special representative. He will conduct public relations activities of BCR and



maintain contact with members, coal producers, associations of coal mining companies, railroads and manufacturers of coal-burning equipment for homes and industries. He joined the BCR staff here on June 1.

T. M. Girdler, chairman of Republic Steel Corp., recently announced the resignation of R. J. Wysor as president and the appointment of C. M. White as his successor. E. M. Richards succeeds Mr. White as vice president in charge of operations. Mr. Wysor has been named by the Allied Control Council to supervise metallurgical operations in Germany and to see that the Reich's steel mills are controlled, dismantled or moved out of Germany.

Lt. Gen. Lucius Clay also named Frederick P. Gaethke, of New York, to direct all mining operations in the American occupation zone. Mr. Gaethke was manager of Anaconda's smelters and mines in Upper Silesia before the war.



Desert heat so sizzling it hatches out an ostrich and sends him scooting for shade, is just cool weather to the tough insulation protecting U. S. Royal Mining Machine and Locomotive Cables. Subjected to torturing temperatures—both high and low—stretched, twisted, bent, battered and soaked, all types

of U.S. Royal Cords and Cables are Safety-Tested by gimlet-eyed laboratory technicians. And under the severest checks in actual service they have widely demonstrated their durability, their lasting circuit-integrity, their definite economy for any mine operator.

THE NEW U. S. ROYAL *Safety Tested* MINING MACHINE AND LOCOMOTIVE CABLES

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Dwight L. Myers, formerly chief field engineer for the Kaiser Company, Inc., at its Vulcan mine, Kelso, Calif., has become industrial specialist for the tin, lead and zinc division of the War Production Board in Washington, D. C.

Robert J. Schultz of Latuda, Utah, has been appointed deputy state coal mine inspector. He will be stationed in Carbon County.

R. P. Tyler, general sales manager of Macwhyte Company, has appointed **Fred M. Sime** as district sales manager for the Pacific Southwest and **Wm. J. Brett**, district sales manager for the Pacific Northwest.

J. C. Rowold, vice president of Mack-International Motor Truck Corp., has been appointed manager of Mack's Pacific Coast Division, according to the announcement made by **A. C. Fetzer**, Mack vice president. He replaces **J. A. Stoner**, who has retired after 28 years of active service with the Mack organization.

James Lewis, superintendent of Peabody Coal Co.'s Kincaid mine at Tovey, Ill., has retired from active service. **Alec Colquhoun**, superintendent of Cass No. 48 mine at Cass, Ind., is transferring to Tovey to succeed Mr. Lewis.

L. Gerald Firth, president of Firth-Sterling Steel Co., has announced election of **Irving W. Wilson** of Pittsburgh, **Arthur H. Bunker** and **Harold J. Szold** of New York, and **A. C. Wickman** of Toronto, as directors. Re-elected to the board were **L. Gerald Firth**, **James W. Kinnear, Jr.**, and **William Loach**. Mr. Loach was president of Wolf Tongue Mining Co. (tungsten), now a division of Firth-Sterling.

The American Manganese Steel Division of the American Brake Shoe Company announces that **J. L. Mullin** has been promoted from general superintendent of foundries to vice president in charge of operations. Mr. Mullin will carry on his new duties from the Amsco headquarters at Chicago Heights, Ill.

Ellsworth S. Hann, comptroller of the Kennecott Copper Corporation, New York City, has been elected to membership in the Controllors Institute of America.

Albert L. Bergstrom, executive engineer for Timken Roller Bearing Co., was recently elected vice president of all engineering for the company.

John H. Jones, who was formerly president of Bertha Consumers Co., has become consultant for, and a member of Six States Coal Corp., and Jones, Inc. Increased production from this corporation's mines is being planned.

Robert V. Clay, known to his many friends as "Barney," vice president of Hanna Coal Company, died of a heart attack at Cleveland, Ohio, June 8, 1945.



Mr. Clay was associated with the M. A. Hanna Company and subsidiaries for over 35 years, starting in 1910 as an office boy.

His career was interrupted by the first World War, in which he served as a sergeant overseas. In 1919, he joined the Susquehanna Collieries Company, an anthracite subsidiary of the M. A. Hanna Company. In 1925 he returned to the Cleveland office to become purchasing agent.

In 1928 he was appointed assistant general manager of the Ohio mines with headquarters in St. Clairsville, Ohio, and was made vice president and general manager in 1932. He returned to the Cleveland office in 1940, to serve in an administrative capacity.

Verne F. Curtis, 46, assistant chief engineer of International Minerals and Chemical Corporation, died of a heart attack April 25 at his home in Evanston, Ill. Mr. Curtis had been associated with International Minerals and Chemical Corporation since 1941.

C. Walter Spalding, manager, power transmission machinery, Link-Belt Company, died in Chicago May 25. Mr. Spalding, whose headquarters were at the company's Ewart plant in Indianapolis, began his Link-Belt career in 1910 at Indianapolis. He is a veteran of World War I.

W. J. German, formerly general superintendent for Pocahontas Fuel Co., Inc., and until recently a colonel in the Corps of Engineers, U. S. Army is now associated with E. I. du Pont de Nemours & Co., Inc., at Huntington, W. Va.

Peter Christianson, 80, professor emeritus of metallurgy at the Minnesota School of Mines, where he taught for 41 years prior to retirement in 1935, died May 17 in Los Angeles, Calif. A deep student of iron metallurgy, he contributed much to its development in Minnesota, both through the department which he headed at the School of Mines and the State Mines Experiment Station.

Edward G. Freidell, one of the original members of the field staff of Anthracite Industries, Inc., died at Syracuse, N. Y., May 11, after a brief illness.

Mr. Freidell, who had been in the heating and plumbing business in Syracuse, joined Anthracite Industries in 1936, covering the Syracuse territory.

Willard Lawson Cumings, 71, geologist for Bethlehem Steel Company since 1906, died on May 15. Mr. Cumings was a graduate of Michigan State College, class of 1892, and took his engineering mining degree at Michigan College of Mines in 1900.

He was largely responsible for Bethlehem's acquisition of many coal, iron and quarry properties and it was due to his geological work that the large ore body at Cornwall, Pa., was developed.

James W. Paul, 73, president of Big Creek Winifrede Coal Co., and director of the research laboratory of Mine Safety Appliances Co., died April 15 in Pittsburgh, Pa. He specialized in first-aid, mine rescue, roof support, safety lamps and oxygen breathing apparatus. He organized the West Virginia mining department and was prominent in mine rescue work in many states as well as in the U. S. Bureau of Mines.

R. C. Huetson, 94, said to have located the famous Iron King mine, near Humboldt, Ariz., and later to have sold it for a \$20 gold piece, died May 21 at the Arizona Pioneers Home, Prescott. He was born in Iowa and followed mining in Mohave and Yavapai Counties of Arizona from 1877 to 1924, when he retired.

— Obituaries —

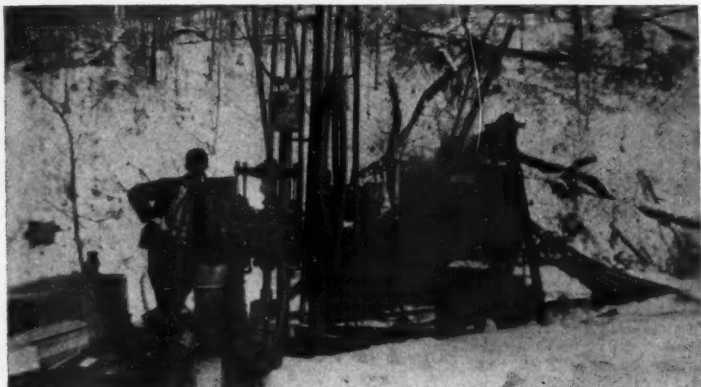
|| Diamond Core Drilling

(Continued from page 26)

in flat contact, do not indicate loss of coal. The appearance of the coal core and the exercise of good judgment constitute the best rule for guidance as to the disposition of a coal core.

When the drill enters the coal bed, to assure a good core there should be approximately a foot of overlying strata in the core barrel, room for

inside is octagon in cross-section. The bottom, sides and top-end of the box and the two bottom quarter-strips are nailed together; since the coal core is in the box when the top and bottom-end and the two top quarter-strips are put into place, they are held by screws which eliminates pounding and jarring. If the coal core is wrapped in oilcloth it is protected from rough places in the box, moisture is retained somewhat, and fracturing is reduced. When coal cores



Exploration work often requires the use of equipment sufficiently portable for transport over rough terrain

all of the coal and at least six inches of underlying strata. Upon approaching the coal horizon it is inadvisable to fill the core barrel so that if the coal bed is unexpectedly entered, it (together with adequate bottom strata) can be cut before the tools are pulled.

Core Case

The construction of the core box is simple, but is most important if the results of the drilling are to be properly protected and preserved. One satisfactory type of box, made from $\frac{3}{4}$ -in. lumber, is square with 2% in. inside dimensions for a 2 $\frac{1}{4}$ -in. core. The use of quarter-strips is desirable, thereby materially reducing breakage and shattering; thus the

are thus boxed and reasonable care in handling is exercised they will not be seriously damaged, but will remain in the approximate condition they were in when delivered from the core barrel.

In concluding, it should be reiterated that the results of diamond core drilling are invaluable, but should be used with the constant realization of the probable limits of the information revealed. Caution is sometimes imperative if too broad interpretations are not to be deduced from the results of a too meager drilling program. The characteristics of sedimentary deposits, some of which have been mentioned herein, should be constantly in mind when evaluating the results of diamond core drilling.

Useful New Bituminous Coal Map

AN EXCELLENT map showing the total distribution of bituminous coal and lignite during the year ended June 30, 1944, has been completed by the U. S. Bureau of Mines. Tabulations for each State give tons and percentages by district of origin. Coal districts are individually outlined in colors and are identified by number.

Production going to Canada, United States railroad fuel, vessel and bunker fuel and export overseas are also tabulated by districts of origin.

The map was prepared in cooperation with the Solid Fuels Administration for War, under supervision of Joseph J. Gallagher and C. R. Gentile of the Coal Economics Division. The bureau has a limited supply of this 27" x 40" map, and copies will be furnished while the supply lasts, to those who have need for them. Application should be made to the Coal Economics Division, Bureau of Mines, Dept. of Interior, Washington 25, D. C.



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ANYWHERE ON EARTH"

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45 YEARS
EXPERIENCE

SKILLED OPERATORS
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MODERN EQUIPMENT
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BORE HOLES
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NO TWISTING! No failures due to one conductor riding over the other. The special D-shaped insulation prevents twisting.

BREAKER STRIP! Separation of the conductors saves time and trouble in making connections and splices.

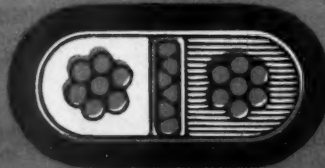
GREATER FLEXIBILITY! The herringbone compensating construction allows freer movement of copper conductor.

REINFORCED WEBBING! Tough Seine twine for extra strength prevents tearing of the jacket. Ask for detailed information at any of our sales offices.

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SECURITYFLEX CABLE WITH SELF-CONTAINED GROUND WIRE

This special cable is only slightly larger in diameter. Standard lengths can be accommodated on the usual conductor reels. Loaders, conveyors, cutters, etc., are easily grounded.



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NEWS and VIEWS

The world's largest mine fan is this 600,000 c.f.m. 600 h.p. Jeffrey installation at Holden, W. Va. Bituminous Coal Institute estimates that over 30 billion cubic feet of fresh air per shift is pumped into American coal mines



Hamilton Wright Photo.

Eastern



States

Pittsburgh Consolidation Coal Company Formed



A plan for the merger of the Consolidation Coal Company and the Pittsburgh Coal Company was distributed to stockholders May 22 following approval of the respective boards of directors, and special meetings of the shareholders of the two companies were called for July 24, 1945, to approve the agreement of merger. Consolidation will be merged into Pittsburgh Coal and the surviving corporation will be known as Pittsburgh Consolidation Coal Company.

The agreement provides that the principal officers of Pittsburgh Consolidation Coal shall be Robert C. Hill, chairman of the board; Augustus K. Oliver, chairman of the finance committee; George H. Love, president; and J. B. Morrow, first vice president.

The plan of merger provides that a majority vote of each class of stock and of the two classes combined of Pittsburgh Coal are required to approve the merger. By reason of Delaware law, in which state Consolidation Coal Company is incorporated, a two-thirds vote of approval is necessary by Consolidation.

The board of directors of either

company for any reason, which includes specifically the potential liability arising from the filing of certain objections by shareholders of either company, may abandon the entire plan even on a date subsequent to the meetings of the stockholders.

The initial board of directors of Pittsburgh Consolidation Coal Com-



George H. Love
President

pany will consist of Arthur E. Braun, George H. Love, J. B. Morrow, Augustus K. Oliver, L. F. Rains, Alan M. Scaife, Arthur B. Van Buskirk, George W. Wyckoff and William P. Witherow, all of Pittsburgh; H. Donald Campbell, Robert C. Hill, Thomas I. Parkinson and Barton P. Turnbull, all of New York; Emory M. Ford, of Detroit; and George M. Humphrey, of Cleveland.

New Geological Society

A regional society "to advance and disseminate geologic knowledge, and to provide a forum for geological problems" has been organized at Pittsburgh under the name: *Pittsburgh Geological Society*. The first meeting was held October 27, 1944. Details of organization have been worked out at successive monthly meetings, culminating at the April meeting when the constitution and by-laws were adopted.

The organizing committee was headed by George C. Grow, Jr., president for 1945-1946. Other first year officers: Raymond E. Birch, vice president; W. B. Robinson, secretary; and Dr. Shailer S. Philbrick, treasurer. These officers, and the following, comprise the council: Robert E. Bayles, Hugh R. Brankstone, C. H. Feldmiller, Dr. Richard M. Foose, John T. Galey, David K. Kirk, and Dr. J. H. C. Martens.

Speakers at the first six meetings and their subjects follow: Major Raymond C. Moore, state geologist of Kansas, now on leave in the Army, "Geology and Geomachy"; Dr. Kirk Bryan, Harvard University, "The Geological Antiquity of Man in America"; Dr. Carey Croneis, president, Beloit College, "Science and the Future"; Dr. Philip S. Smith, chief Alaskan geologist of U. S. G. S., "Alaska's Potential Oil Resources"; Dr. W. C. Krumbein, senior geologist, Beach Erosion Board, "Sedimentation and Its Relation to Oil Finding"; and Dr. Walter H. Bucher, professor of Geology, Columbia University, "The Deformation of the Earth's Crust."

Attendance at the first six meetings, each held in Pittsburgh, has averaged slightly more than a hundred

persons. As had been hoped for by the organizers, the drawing range extends into Ohio and West Virginia as well as throughout western Pennsylvania. The cooperation of personnel of the U. S. Geological Survey and of the Pennsylvania and West Virginia geological survey groups has been of much assistance. It is planned to hold monthly meetings except for the summer months, these to be in Pittsburgh. Field conferences may be held when transportation facilities are improved.

The diverse geologic interests represented in this area include petroleum and gas, coal, iron and steel, refractories and other ceramic industries, as well as academic groups and amateur geologists.

New River Purchases Land



On January 1, 1945, the New River Company acquired approximately 3,000 acres of coal land in fee and the mineral rights on about 2,000 additional acres from Koppers Coal Division, Eastern Gas and Fuel Associates. The tract of land is located in Town district of Raleigh County, W. Va. The original minable tonnage in the Sewell and Beckley beds is about 60 percent depleted. Most of the remaining coal will be taken out through the Skelton mine of the New River Company and eventually the surface plants of Stanaford No. 1 and Stanaford No. 6 mines (old Koppers mines) will be abandoned. This change is expected to bring about important economies in mining operations.

Camp Lightfoot Opens June 16

The tenth annual season of summer camps maintained by Koppers Coal Division, Eastern Gas and Fuel Associates, for the children of its mine workers opened June 26 at Camp Thomas E. Lightfoot, a 76-acre private reservation area on the Big Bend of the Greenbrier River near Hinton, W. Va. There will be four two-week camping periods ending August 24.

Registrations began May 16, at the Koppers Coal mine offices in West Virginia, Pennsylvania and Kentucky. Because there usually are more applications than the 800 season capacity of the camp, Thomas E. Lightfoot, director of welfare for Koppers Coal, states that registrations must be limited to two from each family between the ages of 8½ and 14 years of age. The children pay \$7 each for the two-week period, including private bus transportation from their homes to the camp and return.

Anthracite Distribution Group Holds Meeting



Members of the National Anthracite Distribution Committee held their regular monthly meeting Tuesday, May 15, at Split Rock Lodge, Pocono Mountains resort of the Lehigh Coal and Navigation Co., near White Haven, Pa. The committee is charged with the allocation of all anthracite production, and comprises five representatives of producing companies, two wholesale trade and three retail trade representatives.

Members of the committee were guests the following day of Walter L. Banta, vice president and general sales manager of Lehigh Navigation Coal Co., at the company's properties at Lansford, Pa.

Members of the committee who attended included: Gordon C. Cook, chairman, president, D. L. & W. Coal

Co.; G. B. Fillmore, vice president, Hudson Coal Co.; G. M. Snider, vice president, Dickson Coal Co.; F. W. Buckalew, president, Buckalew, Inc.; Everett Robbie, president, Quincy Coal and Fuel Co.; Robert F. Duemler, vice president, D. L. & W. Coal Co.; Thomas G. Valteau, chief, Anthracite Division, Solid Fuels Administration for War; Robert Hatch, assistant general counsel, Legal Division, Solid Fuels Administration for War; C. W. Stone, vice president, M. A. Hanna Co.; John Schreiber, coordinator, Retail Solid Fuel Industry of New York City; Hugh O. Tompkins, secretary, Fuel Merchants Association of New Jersey, and M. R. Grover, vice president, Anthracite Industries, who is secretary of the national committee.



Handicraft class at Camp Lightfoot

Hamilton Wright Photo.

Camp Wyndal, for the children of colored Koppers Coal miners, will open its sixth season July 6, on the Gauley River near Gamoca, W. Va.

LI. Col. C. R. Mabley Awarded Bronze Star for Work on Coal Supply



LIEUTENANT COLONEL Carlton R. Mabley, chief of the Solid Fuels Branch, Fuels and Lubricants Division, Office of The Quartermaster General, has been awarded the Bronze Star decoration for his "valuable service in connection with the critical problems of supplying solid fuels for the military campaign in western Europe."

The award was presented by Major General C. L. Corbin, Acting The Quartermaster General, at a ceremony in Washington on June 5. The award was made for services rendered by Colonel Mabley while on temporary duty attached to Supreme Headquarters American Expeditionary Forces in Europe last fall and winter. The citation reads:

"Lieutenant Colonel Carlton R. Mabley, Jr., Quartermaster Corps, United States Army, for meritorious service in connection with military operations on temporary duty with Solid Fuels Section, Current Operations Branch, G-4 Division, Supreme Headquarters, Allied Expeditionary Force, European Theater of Operations, from 26 October 1944 to 24 December 1944. Lieutenant Colonel Mabley rendered valuable service in connection with the critical problems of supplying solid fuels for the military campaign in Western Europe. Based on his broad experience in procuring solid fuels for military campaigns and on an arduous survey of coal resources and the facilities for handling coal in Western Europe, Lieutenant Colonel Mabley has given advice and assistance which has been of inestima-

ble value in the solution of this problem. Entered military service from West Virginia."

Prior to receiving his commission in the Quartermaster Corps as a major in October, 1942, Colonel Mabley was assistant to the vice president in charge of sales of the Island Creek Coal Sales Co., although he served at the office of The Quartermaster General for several weeks in a civilian capacity, on leave of absence from Island Creek, before he was commissioned in the Army.

Exploration at Alloy

The Electro Metallurgical Company at Alloy, W. Va., will be doing extensive and comprehensive coal exploration work this summer, including both diamond core drilling and outcrop prospecting, according to reports. Drilling inside the mine, which is in the No. 2 Gas coal bed, penetrates the Powellton and Eagle coal horizons. The surface drilling will test all the coals in the upper part of the Kanawha group of the Pottsville

series. This is looked upon as indicating more long time planning and new industrial development in the Kanawha Valley.

Annual Coal Mining Short Course

The thirty-third annual short course in coal mining is being given at the School of Mines, West Virginia University, at Morgantown; Logan High School, Logan; and Beckley Junior High School, Beckley.

The short courses are designed to give practical mining men an opportunity to study the technical phases of coal mining and to prepare for advancement to executive positions. Forty thousand, seven hundred and eight-five students have enrolled in the courses to date. Opening date was June 11. Classes close July 21.

Tunnel Through Red Mountain?



One of the most important elevations in Alabama is Red Mountain, which lies near the center of the Birmingham mineral district. It stretches a distance of about 25 miles, east and west, running through the southern edge of Birmingham. Two of the main south-bound highways wend their ways over this ridge to cross it at a height of about 1,100 feet above the valleys on each side.

The main part of the business district of Birmingham lies in Jones valley, on the north side of Red Mountain, while a large residential district lies on the south side, in Shades valley. Approximately 27,000 vehicles cross the mountain every day in the year, and in wintertime when the road is covered with snow and ice, the trip is hazardous.

A proposition to open a tunnel through the mountain was under consideration prior to the beginning of the war, but was laid aside until after cessation of hostilities. The project has recently been revived and plans for carrying it through are being worked out now, looking to an early beginning of construction on it, and the prospects are reportedly very favorable.

The opening of this tunnel, approxi-

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ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

Oliver Building Pittsburgh, Pa.

mately three-quarters of a mile long, would unlock the city of Birmingham to traffic and travel to the south, and would be of very great benefit in that respect, as well as in relieving congestion on the other routes. Considerable iron ore and other minerals would be recovered in the operation of driving the tunnel. It is looked upon as a self-liquidating proposition, because of the tolls expected to be collected from its use.

Rapid Method of Determining Surface Moisture of Coal

A RAPID method for determining the surface moisture of coal—an important controlling factor in making coke in byproduct coke ovens—has been developed by Bureau of Mines research workers at the Pittsburgh, Pa., experiment station, according to a publication recently released.

By means of a relatively simple apparatus, a measured sample of the coal to be tested is placed in a solvent such as alcohol and the surface moisture is dissolved. The solvent then is filtered from the coal and its moisture content is determined by measuring the dilution of the solvent by its change in specific gravity.

Although still in the development stage, numerous requests for a description of the method prompted the Bureau to issue a preliminary report at this time. It is believed that the method is accurate enough for practical purposes and that it will be of considerable help in solving some of the problems of the coal and coking industries.

Surface moisture content controls such properties of crushed coal as bulk density and angle of repose, and the real measure of accomplishment in drying or dewatering coal in washeries is the reduction in surface moisture content.

L. D. Schmidt and William Seymour, Bureau engineers who prepared the report, state that the method has been in use for more than a year at Pittsburgh and that it has proved satisfactory. Little skill is required to operate the simple equipment used, and the time needed for measuring the surface moisture of a given sample of crushed coal is about 15 minutes, as compared to several hours

for the ordinary total moisture determination in drying ovens.

A complete description of the method, together with drawings, graph and tables, is presented in Report of Investigations 3811, "A Rapid Method for Determining Surface Moisture in Coal," which may be obtained from the Bureau of Mines, Department of the Interior, Washington 25, D. C.

New Motor Design Gives Trouble Free Operation

A NEW feature in electric motor design, the prelubricated sealed ball bearing has been applied by Westinghouse engineers to eliminate the necessity for greasing except at intervals of five years or longer.

This new bearing consists of the standard single row of balls mounted in races of the same width as the double row ball bearings. Metal shields are anchored solidly in the outer race near the outer edges and extend down and inward to a close running clearance from the inner race. Adequate space for grease is thus provided and at the same time there are highly effective seals against the

leakage of grease or the entrance of dirt.

This construction is reported to give several operating advantages: the tightly-sealed enclosure reduces oxidation of the grease, thus promoting longer grease life; maintenance expense is sharply reduced as frequent greasing is not required; grease is kept in and dirt is kept out; when motors are disassembled the bearings, being enclosed in a cartridge are protected against dirt.

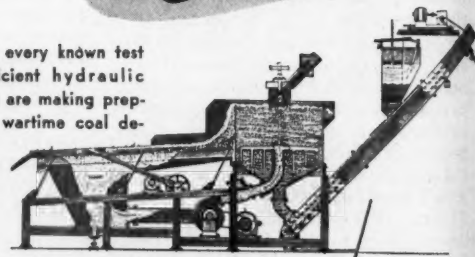
WANTED To Buy

I—Jeffrey No. 35-BB, 50 H.P., 250 Volts D.C., Shortwall Mining Machine complete with 7½ ft. cutter bar, used but rebuilt to first-class operating condition. Quote price, f.o.b. point, details of condition, where available for our inspection, and when shipment could be made.

Address replies to Box "B," in care of this publication.

WILMOT HYDROTATORS Cut COAL PREPARATION Costs

They have been proved by every known test to be the most highly efficient hydraulic cleaning units. Hydrotators are making preparation records in meeting wartime coal demands. Their capacity and greater efficiency will help cut your costs of peacetime operation.



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Builds Better
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A GREAT NAME IN
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Specializing Exclusively in Practical Engineering Application of Fundamental Mine Mechanization Principles; Selection of Proper Equipment; Correct Engineering Planning; Proper Installation; and Efficient Operation.

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Central



States

New 35-Cu.-Yd. Shovel at Fidelity Mine



Forty-five carloads of parts and assemblies for the new Marion 35-cu. yd. coal stripping shovel, purchased by The United Electric Coal Companies, Peoria, Ill., for its Fidelity Mine, have been shipped according to reports. The job of erecting this huge machine is said to be progressing nicely under the direction of Cleon Williams, Marion's chief erecting engineer.

Here are some interesting facts about this Type 5561 coal stripping shovel:

Two dipperfuls fill a regulation railroad coal car to overflowing.

One dipperful will fill a room 9 ft. by 12 ft. by 9 ft.

One 35-cu. yd. dipperful is equal to 52½ tons of material.

If the machine were placed in the middle of a regulation city block, it could reach over into the next block and pile dirt on top of a 7-story building 240 feet away. The electric power required to operate this shovel would serve a community of 3,000 people with all of its power needs.

Book Mine Converts to Underground Method



The Book Mine of the North Range Mining Co., at Crystal Falls, Mich., on the Menominee iron range is undergoing a changeover from open pit to underground mining. The property was stripped in 1942 and has been producing by means of power shovels and trucks. Adits from the pit banks will provide haulage-ways for underground ore which will be hoisted to surface by a double-track slope and balanced-hoist system in 4-ton skips. Capacity is said to be 100 tons per hour.

Sintering Plant Damaged by Fire



The coal and coke preparation department of M. A. Hanna Company's sintering plant at Crosby, Minn., was damaged by fire on May 10 to the estimated extent of \$100,000.



Huge shovels, capable of handling tremendous stripping assignments, have assumed greatly increased importance in recent years. Seven men, shoulder to shoulder, span the dipper mouth

A concrete fire wall separating the fuel and ore preparation room from the main part of the plant prevented damage to the sintering plant proper. Flames originating on the ground floor spread upward and destroyed the two upper floors of the department. Activity in sintering will be delayed some 60 days before this 1,200-ton-per-day plant is again operating.

Eye Protection Research



To aid in furthering the eye protection of industrial workmen, a new research program has been initiated at Battelle Institute, Columbus, Ohio, under the sponsorship of the American Society of Safety Engineers, Engineering Section of the National Safety Council.

To involve a year of investigation, the program is intended to provide information that will be used by safety experts and eye-protector manufacturers to help in combating the some 75,000 disabling eye injuries and several hundred thousand non-disabling injuries that occur yearly in American industry. The investigation will apply particularly to the evaluation of the performance requirements and specifications of satisfactory plastic eye protectors, which are now finding increasing use in industry.

As explained by Clyde Williams, Battelle director, eye protectors—such as goggles and face shields—are the final means of eye protection for individual workmen. When correctly designed—and when worn—they protect the worker's eyes from flying chips of metal, spattering chemicals, sparks, and other hazards of industry. If not of sufficient protective power, however, they give false security; and if uncomfortable or tiring to the eyes, workmen refuse to use them and, instead, "take their chances." Taking chances in 1943, according to reports of the National Safety Council, resulted in 75,000 eye injuries to workers, 5,000 of which were permanent.

During the war years there has been a rapid increase in the use of transparent plastic materials for the lenses of goggles, for the eye pieces of gas masks, and for eye and face shields. The quality of these protectors range from those in which consideration has been given to strength and optical properties to protectors untested in these respects. Recognizing that plastic eye protective devices are now in use and that their application in industry may expand, the National Safety Council wishes to establish performance requirements and specifications for satisfactory plastic eye protectors.

The research by Battelle will include both laboratory and statistical investigations. A field survey of present experience with various types of plastic eyepieces will be made to study the types of devices in use, nature of hazards, protection experience, evidence of eye strain, acceptance and use by workmen, and other evidences of advantages or disadvantages. Proceeding concurrently will be physical and optical tests to determine adequacy of protection, design, light transmission, eye strain and fatigue, and other factors. The combined data will be used by eye-protector manufacturers in setting standards for their products and in industry for the specification of desirable types of protectors.

The National Safety Council is a nonprofit organization supported by industrial, trade, association, and individual membership. It promotes safety in every field of human endeavor by the gathering and distribution of information about accidents and methods for their prevention.

F&M Resumes Operations



The F&M Mining Company resumed operations at its mill at Oronogo in mid-June after a shutdown which lasted four months.

The Number 4 hopper and derrick were moved to a point nearly a quarter of a mile south of Eagle-Picher's American mill. A roadway was built so as to set the derrick-hopper some 30 feet below street level in the old La Tosca caved area. Mine operations

SAUERMAN LONG RANGE MACHINES

CUT HANDLING COSTS



Above is a typical Sauerman Scraper installation with self-propelled tail tower as used at mines and processing plants for open storage of materials. This type of machine is able to cover a wide storage area, and handle a large tonnage both storing and reclaiming.

THERE is three-fold economy in using a Sauerman Power Scraper or Slackline Cableway for digging and hauling or stockpiling.

First cost of a Sauerman machine is moderate, operation is an easy one-man job and upkeep is simple.

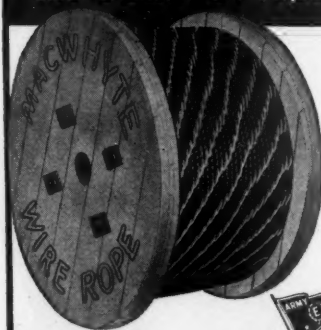
Sauerman engineers will gladly study your material-handling problems. Their advice may save you money and will be given free.

Catalog on request

SAUERMAN BROS., Inc.
540 S. Clinton St. CHICAGO 7

are being carried on at the 130-foot level according to Gilbert Fenix, who is in charge of operations.

The CORRECT rope for your mining equipment



MONARCH Whyte Strand
PREformed...Macwhyte's best grade wire rope...famous for its strength, toughness, and internal lubrication.

Request Catalog on your company letterhead!

170 pages of information. A request on your company letterhead will bring it to you promptly. Ask for Catalog G-15.

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- Internally lubricated
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Manufacturers of MACWHYTE PREformed and internally lubricated Wire Rope, MONARCH WHYTE STRAND Wire Rope, MACWHYTE Elevator Wire Ropes, MACWHYTE Braided Wire Ropes, Sings, MACWHYTE Aircraft Cables and Tie Rods.
Mill Despts. New York, Pittsburgh, Chicago, St. Louis, Portland, Seattle, San Francisco.
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Lake Shipping Season Lengthened by the United States Coast Guard Ice- breaker "Mackinaw"

DESTINED to remain on the Great Lakes by virtue of draft and beam, the mission of the *Mackinaw* was recently clearly defined by Vice Admiral Russell R. Waesche, Commandant of the United States Coast Guard, who stated: "She will open shipping lanes probably three to four weeks earlier in the spring and keep them open later in the fall. She will be ready to aid commercial shipping whenever required to do so and to perform any rescue operations. Of imperative importance is her assignment to clear the way for new Navy construction that must move through the Lakes during the winter."

During the summer the vessel will be used to handle the heaviest buoys on the Lakes; to carry oil and provisions to distant lighthouses and stations; to serve as a training ship for Coast Guard personnel; and to do any salvage work that is necessary.

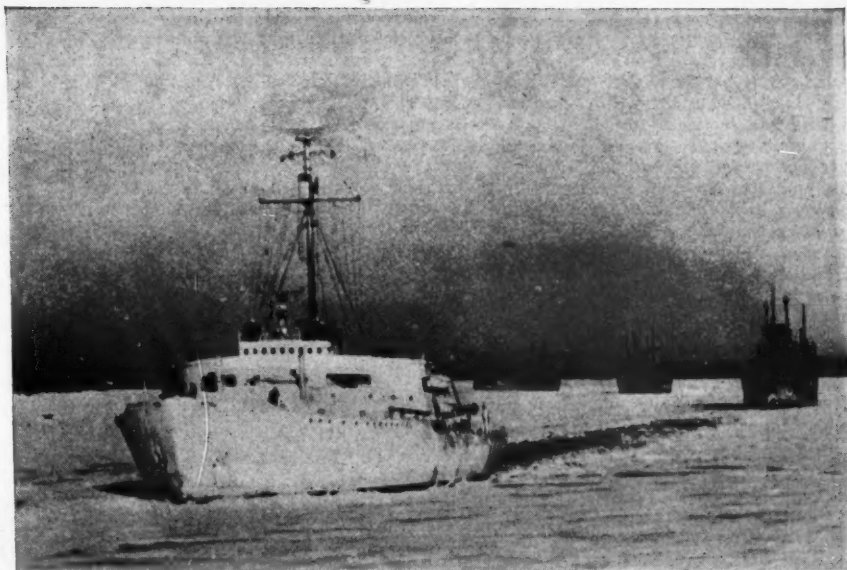
The icebreaker is 290 ft. long, 74½ ft. abeam, displaces 5,090 tons and de-

velops 10,000 shaft h.p. The vessel has a normal draft of 18 ft. 10 in., forward and aft. It was built by Toledo, Ohio, Shipbuilding Co. The keel was laid March 20, 1943. The vessel was launched March 3, 1944 and commissioned December 20, 1944.

Six diesel engines of 2,000 h.p. each drive six electric generators of 1,375 k.w. each. These generators supply power for three electric propulsion motors, one for the bow screw and two for the after propellers. Each of the stern motors is capable of supplying 5,000 shaft h.p. and the forward motor 3,300 shaft h.p. All auxiliaries are electric with power supplied by four auxiliary diesel-driven 200 k.w. generators. Oil fuel capacity is 440,-

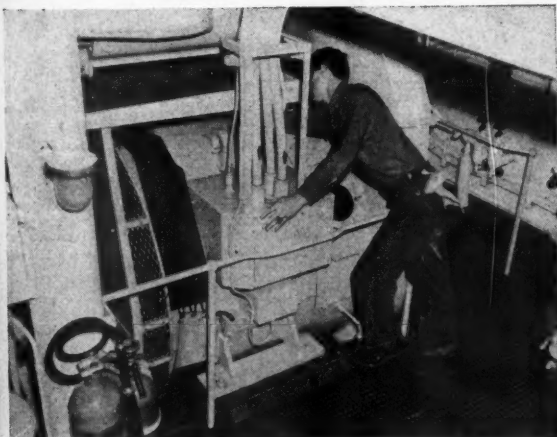
000 gallons. The unique forward screw can rotate to advantage in either direction. It can be used to cut ice, to create a wash or vacuum, and when reversed to suck water from under an ice sheet. This changes the static buoyancy of the ice and facilitates icebreaking by the cutaway bow. Forward propeller is 12 ft. in diameter; the two after screws are 14 ft. in diameter. All propellers are three bladed.

Plating is 1½ in. thick at the ice belt; 1 in. thick below the ice belt and ¾ in. thick above the ice belt. *Mackinaw* has 30 miles of single bead welding in plating and altogether throughout the vessel 150 miles of single bead welding. There is not a



U. S. Coast Guard Official Photos.

The "Mackinaw" breaking through the ice on St. Mary's River, followed by three cargo vessels



Six diesel-driven Westinghouse generators provide electrical energy for two stern motors and one bow motor, direct connected to propeller shafts



U. S. Coast Guard Captains Beckwith Jordan, G. W. Cairnes and L. B. Olsen put the icebreaker through trial runs on Lake Huron prior to its acceptance by the Coast Guard

single rivet in the entire hull structure.

General construction consists of truss frames spaced on 16-in. centers and space between shell and inner skin is utilized for fuel storage tanks. Vessel has facilities for carrying approximately 400 tons of cargo and provisions for six months. Anchors are self-stowing and are located in housing hawse-pipes so that nothing projects beyond the hull. Ship has a notched stern permitting entry of a freighter's bow during towing or ice-breaking operations. Towing engine has automatic tension control which pays out two inch wire cable when excessive surges occur, automatically recovering the cable when the pull drops below the value at which the control is set.

Ship is insulated against 30 degrees below zero temperature by a 3-in. layer of cork on all outside surfaces.

Powerful pumps in the vessel are for trimming forward and aft and heeling to port and starboard, keeping the vessel free when working on the ice. Four electric drive pumps are used to transfer 400 tons of water from port to starboard and back again in a total time of four minutes. The fore and after pump can transfer 150 tons of water in a completed cycle of 16 min. The trimming pumps can be used to place the vessel in the best icebreaking position. It recorded a speed of 18.8 m.p.h. in full power runs during trials. There are two 12-ton cranes aft to handle aids-to-navigation.

Comdr. Edwin J. Boland, USCG, of Buffalo, N. Y., is commanding officer of the *Mackinaw*. Normal complement is 10 officers and more than 100 men.

Foreign Language

(Continued from page 31)

American Engineers Receive Important By-Product

The foregoing delineation of the research, planning, and correlation necessary indicates the tremendous detail of the program. Like many a mine, however, one of its by-products gives promise of exceeding in value the primary product; that by-product is the training of teachers of English for our own engineering students.

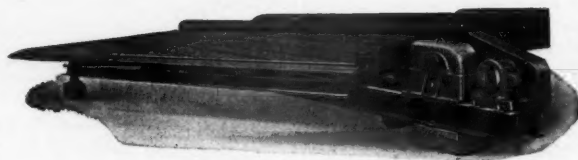
One of the foremost difficulties in the teaching of English to engineering students has arisen from the fact that the instructor had little concept of the real meaning of the technical terms the students are expected to use. Hence he passed over any of these terms that might arise.

Now an instructor in the Intensive Course in English for Foreign Engineering Students must teach not the words alone but the concepts. It is

impossible for him to do this without having a real feeling and understanding of these concepts. This will certainly mean that the instructor will be better able to teach English to all engineers. A real advance in the quality of English teaching to our native students is already apparent at the Colorado School of Mines as a result of the instructors' experience in the intensive course for foreign students. So valuable is this experience that the intensive course will be used as training for all instructors in English at this institution.

Save Paper!

The paper-saving campaign with all its excellent results to date still needs every possible effort in its behalf. Every pound of paper that gets back into badly needed packaging materials will conserve manpower and contribute importantly to V-J Day.



GET A HIGHER GRADE CONCENTRATE with

SuperDuty

DIAGONAL DECK CONCENTRATING TABLES

Producers of critical minerals report that the exclusive *Diagonal Deck* of SuperDuty Concentrating Tables produces an effective "fanning out" action, thus permitting a more accurate cutting of the concentrate yield. This, together with the smooth, powerful "kick" of the Conenco Anti-Friction Head Motion, and other features, gives not only a much higher grade concentrate, but also increased production.

With their basic and well recognized Sand or Slime *POOL RIFFLING SYSTEMS*, SuperDuty tables also provide surpassing recoveries and the handling of more actual tons of new feed per day per table . . . to an extent not previously associated with concentrating table operation.

In addition to its many other unusual features, the SuperDuty Diagonal Deck Concentrating Table comes to you with complete factory aligned underconstruction an integral part of the unit—no need for you to supply anything additional to effect a finished installation. Write for Bulletin 118-A and full details today.



★ The ORIGINAL Deister Company ★ Inc. 1906

Western



States

Ohio Copper Obligated to Make Change in Ore Treatment



Net operating profit of the Ohio Copper Company of Utah for the year 1944 amounted to \$40,198.24 before depletion, depreciation and amortization, according to the company's annual report.

The company operated a concentrator at Lark, Utah, for the treatment of mill tailings accumulated from a former operation, a leaching plant for recovery of copper from old mine stopes, and the Big Indian mine and concentrator at La Sal, in southeastern Utah.

President Percy H. Kittle in his report to stockholders, states:

"Production of copper from leaching increased slightly with a resultant increase in earnings.

"The gross revenue received from the underground railway declined materially and in spite of reduced operating expenses the profit was about halved.

"The report last year advised of the completion of a leaching plant at the Big Indian mine having a capacity of 250 tons of ore per day, production from which is under contract to Metals Reserve Company, a government agency. Early in 1944 directives of the War Production Board diverted the supply of acid relied on and absolutely essential to the leaching method of operation. Thus the company then had a large investment in plant and equipment at this property without the acid with which to operate. Although concentration by flotation of this type of ore, using ordinary methods, had never been particularly successful, the management decided that the only means of redeeming this acute situation was to convert the plant from leaching to flotation after laboratory tests, using a new technique developed by a Salt Lake City metallurgist, had indicated a satisfactory recovery of the metal values. To further determine the feasibility of this type of operation, sufficient equipment, most of which was on hand, was installed to permit the treatment by this new flotation process of from 40 to 50 tons of ore daily. After four months of operating in this manner, results warranted ordering additional equipment to increase the flotation capacity to 250 tons of ore per day. Sufficient of this equip-

ment has now been installed to operate at a daily rate of 175 tons and the full tonnage of 250 should be attained shortly. These difficulties were beyond the control of the management, necessitated changing operating methods, and prevented profitable operation of this property during the past year. So far in 1945 the property has been operating on a profitable basis."

North Lily Shows Loss

Net loss of the North Lily Mining Company for 1944 amounted to \$3,504.65 before depletion, according to the annual report. During the year, states Frank A. Wardlaw, Jr., the company carried on as active a program of mining and development as the prevalent shortage of manpower would permit.

The company and its subsidiaries shipped 13,944 dry tons of ore which yielded 237,061 lbs. of copper, 48,929 lbs. of lead, 25,929 lbs. of zinc, 58,054 ozs. of silver and 5,029 ozs. of gold. A total of 4,845 ft. of development was performed and 4,453 ft. of diamond drilling was completed.

Montana Mineral Exhibit



Montana's widespread and varying mineral deposits were widely advertised to Midwest residents recently when a comprehensive display of all the metallic and non-metallic minerals to be found in the state was shown in the Twin Cities for three weeks.

Montanans, Inc., the state chamber of commerce, first sent the exhibit to Minneapolis, where it was shown for two weeks and was kept open nights for the last half of the period in order to accommodate the crowds. Then, because of popular demand, the exhibit was moved to St. Paul and there displayed for an additional week.

W. G. Ferguson, executive secretary of Montanans, Inc., said it was felt the presentation of the display offered Midwestern residents a chance to become better acquainted with Montana's minerals production and possibilities. The exhibit was shown at the same time the state chamber of commerce announced plans for institution of an industrial development division,

which is designed to assist Montana communities and individuals in inaugurating and developing new industries.

The minerals exhibit is owned principally by the Last Chance Gulch Mining Association of Helena but various other Montana associations, companies and agencies assisted by contributing samples, working models and displays. In addition, each person who visited the display was presented with a four-page booklet dealing with Montana minerals and including a three-color map showing the distribution of the various ores.

Attendants who were present to explain details of the exhibit and to answer questions estimated between 30,000 and 40,000 persons visited the display during the three weeks. Plans are now under way to show it in some other metropolitan city, possibly on the Pacific coast.

FOR SALE

50-Ton Texas Mill

This is the most modern and completely equipped, electrically-operated, fifty-ton mill in the Southwest for treating copper, lead and zinc, fluorspar, and tungsten ores.

- Transformer Station
- 2 Jaw Crushers
- 1 Simons Two-Foot Cone
- 2 Ball Mills
- 2 Conveyors
- 2 Ore Feeders
- 1 Thickener
- 1 Conditioner
- 3 Denver Jigs
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- 3 Tables
- 1 Dings Magnetic Separator
- 1 Rotary Drying Furnace
- 2 Water Pumps
- 1 24" Dorco Classifier
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- 14 No. 18 Denver Flotation Cells
- Pumps and Piping for All Equipment
- Complete Laboratory Equipment
- Complete Sampling Equipment

If interested, please send for complete mill inventory. Address all inquiries to:

ALLOY METALS

810 N. Stanton St.
EL PASO, TEXAS

Any reasonable offer will be considered

To Deepen Shaft



The Coeur d'Alene Mines Corporation has levied an assessment of 2 cents per share to provide funds for sinking the shaft from the 2,200- to 2,600-ft. level. The assessment will bring in \$57,900.78 on 2,895,039 shares of outstanding stock. Formerly the company has paid dividends totaling \$550,057, but the ore body lost its silver values from the 2,000- to the 2,200-ft. level. Geologists call it a "lean zone" and predict the silver values will return at a deeper level. During the past few months the company has opened a parallel vein with promising silver values and which will also be further prospected with the new shaft development. The property is equipped with a modern 600-ton capacity flotation milling plant.

Rattlesnake Creek Property Opens

Seattle capital, headed by Sandstrom & Company and R. L. Trout, have purchased a newly opened lead-silver property on Rattlesnake Creek near Salmon, Idaho. The new owners are producing crude ore for shipment to Salt Lake smelters, but are planning to erect a milling plant as soon as men and supplies can be had.

Whitedelf to Enlarge Operations

Congressman Compton I. White, president of the Whitedelf Mining Company at Clark's Fork, Idaho, announces that the company has employed Frank H. Mitchell, formerly superintendent of the Knob Hill mines at Republic, Wash., as superintendent and general manager of the Whitedelf. The company is making extensive improvements, including enlargement of the milling plant and sinking the shaft to deeper levels. The mine has produced nearly \$1,000,000 in lead-silver ore. A recent shipment of 47 tons of concentrates netted the company \$7,789, averaging 152 ozs. of silver and 41½ per cent lead per ton.

Bradley Tungsten Developments

The Bradley Mining Co. continues to be a large producer of tungsten ore. Most of the Bradley Company's tungsten output comes from the Yellow Pine mine at Stibnite, Idaho, which was originally developed for its gold values. Recently the company has optioned the Ima tungsten mine at Patterson, Idaho, which has been a large producer of tungsten for several years. From these mines the company is now producing a large

part of the tungsten ore mined in the United States. The company has a large processing plant at Boise, Idaho, where some of the tungsten concentrates are stepped up to 75 percent tungstic oxide to meet requirements of eastern manufacturers. The company has erected a pilot smelter at Stibnite, Idaho, near the Yellow Pine mine, for the experimental treatment of concentrates containing gold and antimony. Most of Idaho's gold output for 1944 was a by-product from the tungsten operation.

New Facilities at Warren



New milling facilities for copper, lead and zinc are to be provided in a general alteration and renovation of the old concentrator at Warren, Ariz., according to reported plans of the Phelps Dodge Corporation. Capacity of the initial units is said to be between 400 and 450 tons daily. Ores to be treated will come from the Copper Queen branch in the Bisbee district.

IN OPEN-PIT OR UNDERGROUND

It Is Easier and Quicker to Tamp With BAGS

With a supply of tamping bags at the face shot-firers can make a better tamp easier and quicker. The cost of SEALTITE TAMPING BAGS and an unskilled man to fill them to keep a supply at the face is more than offset by savings in time and powder.

It's important to have right sized bags—to be as near the bore hole size as possible as it gives a better tamp and prevents blown-out shots. All SEALTITE bags are uniformly sized.

To prove that SEALTITE BAGS give a better tamp—that they increase safety—keep fumes and smoke to a minimum—decrease the amount of explosive and still increase production Tamping Bag Company will furnish enough samples FREE—to make your tests. Write for them now.



Asbestos Operation Closes

The Johns-Manville mine at Chrysotile, producer of non-metallic asbestos, has been closed, and the mill building and processing machinery and portable equipment moved to other company locations. Early war demands led to the erection of the plant in 1941. Current and prospective postwar conditions will not warrant the continued operation, it was said by the company.

Adds Another Quicksilver Unit

An additional unit has been added to the milling plant of the Arizona Quicksilver mine, operated in the Sunflower district near Tonto Basin by the National Mining and Milling Company. Operations were started at the mine in 1943, and production has been under way since May, 1944. A new 60-ft. rotary furnace was in operation by summer of the latter year.

Tungsten Producer Closes

The Golconda division of the Nevada-Massachusetts Company, second largest producer of tungsten in this country, has closed (as of June 1) according to President Charles H. Segerstrom. A 100-ton chemical process plant was operated at Golconda. The closing of this plant, it is understood, is due to termination of premium prices for tungsten concentrate, exhaustion of the higher-grade ore and the growing manpower shortage. The announcement did not indicate that the plant and the open-cut scheelite-manganese mine nearby would be dismantled and abandoned.

Moderate Activity Forecast

Activity in mining is looked for by mining men of Nevada, but they are conservative enough to say that it is not coming back with any rush, nor with a boom. The conditions which made mining (of anything but war essentials) an "ancient industry" are not going to disappear for a long time, say state mine operators. Despite inhibitions there have been some prospectors in the hills, but if they have discovered anything it has not been made known to the general public.

A revival of gold mining is looked for just as soon as the ban is lifted, and as soon as men and materials for mining become available, but the gold-mining war restraints, it would appear, are going to continue having

their effect for a long time after they are raised.

There is hope that the SEC may relent somewhat to permit sales of mining stock in companies that are just "trying to get a start" or that some of the arbitrary powers vested in the SEC may be rescinded. One

printing plant recently reported an order for 1,000 stock certificates, the first in years in Nevada. Another sign which may portend something in the mining game, was the recent publication of a delinquent (assessment) sale notice which occupied two columns, mostly delinquents.

BOOK REVIEW

HANDBOOK OF MINERAL DRESSING. By Arthur F. Taggart, professor of Mineral Dressing, School of Mines, Columbia University. John Wiley & Sons, Inc., New York. 1,915 pages. \$15.00

PROFESSOR TAGGART and 13 contributing authors have given the mining industry the long-awaited "new Taggart." Successor to the book that has been the ore-dressing bible since 1927, the new volume covers all phases of mineral dressing in 22 sections. Designated as Volume I, the book deals with the processes largely mechanical, involved in the concentration of metaliferous ores and the beneficiation of industrial minerals.

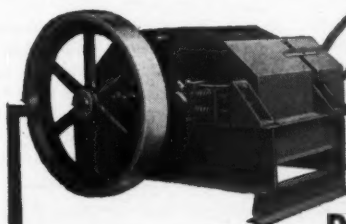
Volume II, to be offered later, is

planned to treat of the preparation of fuels and of the methods, mostly chemical, by which metaliferous and non-metallic concentrates are rendered into primary-consumer products.

Revision has involved rewriting of about half of the first edition and several new sections have been added. The flow sheets employed throughout the book carry top-of-the-sheet headings and vertical dividing lines separating each of the various processes utilized so that one may tell at a glance the general nature of treatment.

Costs as given are dated. They may usually be related to the present time by employing a multiplier representing the combined labor and commodity index figures for the published date and the present.

WHEN THE PROBLEM IS



Crushing

INSTALL

**MARION
DOUBLE ROLL
HEAVY DUTY COAL CRUSHERS**

● Increase the market value of your coal by preparing it in demanded sizes with *Marion Coal Crushers*. Rolls adjustable for different size products. Least expensive to own and operate, they give quick return of purchase price and up profits. Sheet steel enclosures for clean, safe operation. Capacities from 22 to 400 TPH. Fly Wheel Pulleys are standard equipment, but gears can be furnished for direct connection where space for belt drive is lacking. Special drives to suit conditions. Just lay your problem in our engineers' laps!

**Your Coal is no Better than
Your Crushing Equipment!**

Marion Coal Crushers have been in use in various designs for over 30 years. Constantly improved, they pay dividends in low-cost, efficient production in thousands of mines. Have this sturdy, trouble-free equipment!



Write for Specifications and Prices Today!

MARION MACHINE, FOUNDRY & SUPPLY CO.
MARION, INDIANA, U.S.A.

MANUFACTURERS FORUM

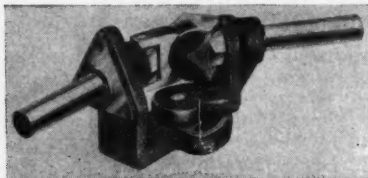
Wire Rope Slings to Be Registered for Safety

American Chain and Cable Co., Inc., Bridgeport, Conn., has recently announced on behalf of its two wire rope divisions, the American Cable Division and the Hazard Wire Rope Division, that their several types of wire rope slings may now be accompanied by a certificate of test and registry for the benefit of the sling user. The policy of selling registered slings is said to be new to the entire wire rope industry.

There are several user advantages. All registered slings are made from Preformed wire rope of Improved Plow Steel. Terminals develop the full strength of the sling body and many will carry the new ACCO-LOC Safety Splice. The certificate furnishes a permanent record of the original strength rating of the sling, the safety factor upon which that rating was based, the actual proof load, and conditions of the sale. Each sling carries a metal tag which shows registry number, sling type, and maximum load rating.

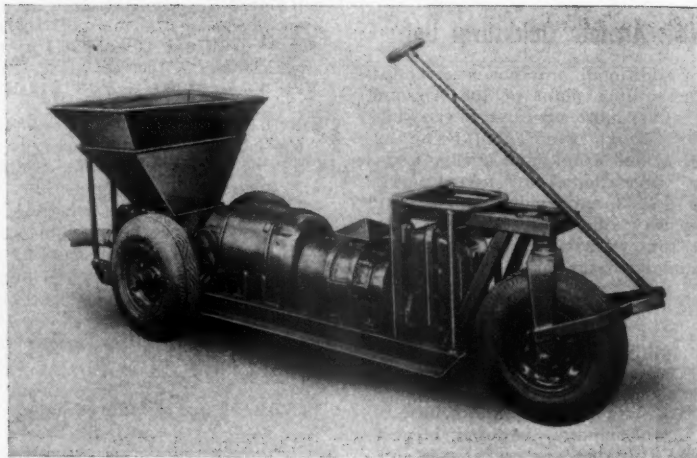
New Universal Link Joint

The Piezo Universal Link Joint features an adjustable link mechanism to transmit rotary motion around corners, permitting the operation of



shafts at angles adjustable from a straight line, 0 degree to a right angle, 90 degrees. With the use of solid shafting and the absence of flexing or backlash this is said to make an ideal method for accurate remote controls and the simplicity of installation is reported to make it preferable to bevel gears, racks, toggles and other mechanical equipment usually employed for this purpose. A feature of this joint is the fact that the output shaft turns in the exact angular rotation as the input shaft,

New Rock Dusting Machine



Quick, effective, economical rock dusting right up in the working place is now reported possible with the new M.S.A. Bantam High Pressure Rock Dust Distributor. This latest M.S.A. development (the Bantam) combines the advantages of the high pressure type of duster and the portability of low pressure type dusters.

This high pressure duster makes

the rock dust stick on the ribs and roof due to application under high pressure with low volumes of air. The Bantam, being light and portable, can be readily moved to all locations, it is said, and with its 50 ft. of 2 in. diameter hose it provides effective distribution of rock dust to heretofore inaccessible places. It is especially designed for work in trackless sections.

Mine and Smelter Supply Company Celebrates 50th Anniversary

On April 23, 1895, the first directors meeting of The Mine and Smelter Supply Company was held in Denver, Colo. Several years later houses were established in Salt Lake City, Utah, and El Paso, Texas, and about 1907 the headquarters were moved to New York. An office was opened there, but this was returned to Denver in 1929 and has remained there ever since. Today the company has sales offices in New York and San Francisco and agents are established throughout the world.

The company has served the mining industry of the West for 50 years in supplying it with all types of equipment, machinery and supplies. In 1907 Mine and Smelter entered the manufacturing field at the time the patents were acquired to the Wilfley Concentrating Table. Thousands of these tables have been manufactured

and sold, and in 1915 the Marcy Ball Mill was developed for the fine grinding of ore. In recent years new lines have been added to the list of specialties that are manufactured; among them are pinch valves, flotation equipment, bit grinders, hot milling machines, density regulators, etc. The Industrial Supply Division of the company, centralized mainly in the three locations at Denver, Salt Lake City and El Paso, specializes in the distribution of machinery, mill supply, electrical and chemical items.

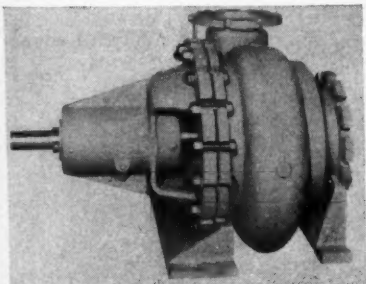
The present officers of the company are: Albert E. Seep, chairman of the board; Oscar A. Johnson, president; Herman F. Seep, vice president; G. F. Olson, secretary-treasurer; E. H. Hughes, assistant secretary-treasurer.

The first three with Harry J. Gundlach, general purchasing agent, and J. D. Nicholson, general manager, constitute the board of directors. R. W. Butler is manager at Salt Lake City and R. S. Beard is manager at El Paso. S. C. Hinkle is assistant manager at Denver.

New Slurry Pump

The Allis-Chalmers Mfg. Co. is announcing its new type "CW" slurry pump, designed for solid, abrasive, and corrosive materials handling, and sludge disposal in metal and non-metallic mining industries.

The pump is reported to be constructed of a tough abrasive-resistant



alloy and laboratory and field tests show that this alloy plus the special pump design increases pump life two to four times over pumps constructed of ordinary materials.

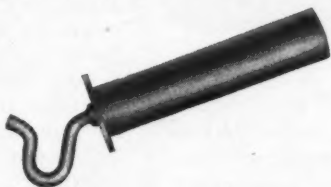
Simplified design results in fewer parts than in comparable pumps, requiring minimum maintenance. Removal of the entire rotating element without disturbance of suction or discharge piping is possible.

Efficiencies of the new pump are comparable to those of ordinary high efficiency clear water pumps. Seven sizes have been developed to handle through 7,000 gpm.

Complete details in Bulletin B6381, available on request, Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

New Trolley Tap

The Mosebach Electric & Supply Company, 1152 Arlington Ave., Pittsburgh 3, Pa., announces a new Mesco Trolley Safety Tap for underground use and for which patents are pending. It is reported that this tap can



be used to operate any type of portable equipment beyond the trolley line.

The assembly consists of a copper hook attached to a bronze fuse receptacle, and a similar fuse receptacle at the opposite end of the barrel, for attaching to cable connector. These assemblies are surrounded by an insulated tubular housing with fibre guard at hook end as illustrated to protect against trolley wire.

Mesco Trolley Safety Taps are available in several different styles. The manufacturer will furnish complete information and prices on request.

New Armor-Clad, Fully Insulated Electrode Holder

A new armor-clad (screw type), fully insulated electrode holder has been announced by the Electric Welding Division of the General Electric Company. The new holder is recommended for use wherever durability, maximum safety, and minimum operator fatigue are desired.

The head is completely enclosed in a sheath of aluminum armor which protects the insulation, resists weld spatter, and eliminates the possibility of accidental contact with the welding circuit. Thus the holder remains clean while in use and lasts considerably longer than insulated holders without armor cladding.

Designed to accommodate electrodes up to and including $\frac{1}{4}$ in. in diameter, the holder is easy to use, light in weight (15 oz.), and unusually cool in operation. A slight twist of the hand tightens or releases the electrode. While in use, the holder firmly grips the electrode at the proper angle and good current contact is maintained. This keeps the holder cool, tends to prevent overheating of the electrode, and maintains a uniform melting rate clear down to a stub end. The threads of the push-up rod do not carry current. A soldered cable connection also helps the holder to remain cool. The width of the electrode slot limits the

size of the electrode which can be inserted, thus preventing overloading.

New Portable Fire Extinguisher

A new fast-acting portable fire extinguisher is announced by American-LaFrance-Foamite Corporation of Elmira, N. Y.

It is the Alfite Speedex, made in three different sizes, Models 15, 10, and 4, and uses carbon dioxide as the fire extinguishing agent.

This new unit is engineered to more speedily extinguish small oil or electrical fires, with no loss of the important extinguishing gas on anything but the fire itself.

The Speedex operating valve lever is directly above the carrying handle. It can be instantly opened by the pressure of the hand grip and as quickly closed by releasing the hand pressure while operator is maneuvering his position.

CATALOGS AND BULLETINS

ADHESIVES. *The B. F. Goodrich Company*, Akron, Ohio. A new booklet on natural and synthetic rubber adhesives. Directions for the application of natural and synthetic rubber cements are included. Copies upon request.

HARDENABILITY CALCULATOR. *The Timken Roller Bearing Company*, Canton 6, Ohio. A new circular slide rule to be used in computing the approximate hardenability of steel from its chemical composition and grain size in accordance with standard formulae has been designed by the metallurgical engineers of the Steel and Tube Division. A free copy may be obtained by writing a request on your firm's letterhead.

FLUID HANDLING EQUIPMENT. *J. A. Zurn Mfg. Co.*, Erie, Pa., publishes Fluid Handling Equipment Catalog No. 45, which describes a complete line of tested devices for the protection of operating equipment connected with the piping systems utilized in industrial, processing and power plants.

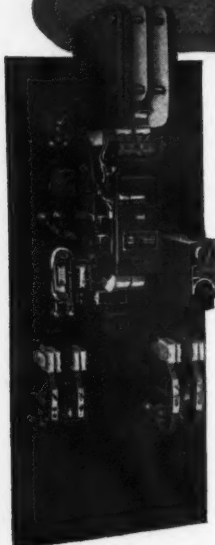
PUMPS. *Fairbanks Morse & Co.*, Pomona, Calif. Two new bulletins: AQB400.1 deals with an oil lubricated turbine pump with enclosed impellers; and AQB500.1 is about the low-lift large capacity Niagara propeller pumps.

STORAGE BATTERY BOOK. *Philco Corporation, Storage Battery Division*, 467 Calhoun Street, Trenton, N. J. A book of practical information for purchasing men, engineers, specification writers and designers of battery powered equipment. Full range of battery facts, specifications, capacities, discharge curves, etc., under all types and conditions of use.

TRACKLESS COAL CUTTER. *Sullivan Machinery Co.*, Michigan City, Ind. The 10-RU trackless coal cutter is fully described in a new bulletin obtainable upon request to the company.

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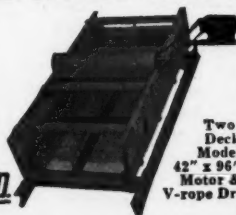
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